TRANS-MINIAUTO++
AUTOMATIC START UNIT
FOR GAS/DIESEL/GASOLINE GENERATORS
WITH J1939 ECUs
User Manual

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EU DECLARATION OF CONFORMITY

Manufacturer's Name : EMKO ELEKTRONIK A.S.
Manufacturer's Address : DOSAB, Karanfil Sk., No:6,
16369 Bursa, TURKEY

The manufacturer hereby declares that the product:

Product Name : Automatic Start Unit

Type Number : TRANS-MINIAUTO++

Product Category : Electrical equipment for measurement, control and laboratory use

Conforms to the following directives :

2006 / 95 / EC The Low Voltage Directive

2004 / 108 / EC The Electromagnetic Compatibility Directive

has been designed and manufactured to the following specifications:

EN 61000-6-4:2007 EMC Generic Emission Standard for Industrial Environments

EN 61000-6-2:2005 EMC Generic Immunity Standard for Industrial Environments

EN 61010-1:2001 Safety Requirements for electrical equipment for measurement, control and laboratory use

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When and Where Issued

07th January 2012

Bursa-TURKEY

Authorized Signature

Name : Serpil YAKIN

Position : Quality Manager

1.Introduction

1.1 General Specifications

The unit provides automatic start and stop the engine and protect the generator system. Both automatic and manual control is possible. A test mode is also available which allows the generator to be run for checking the generator system.

The unit calculates engine RPM from Magnetic Pickup sensor input (Trans-MiniAUTO++.MPU devices only) and/or generator voltage signal. At Trans-MiniAUTO++.CAN devices, unit gets engine RPM information from J1939 ECU and/or generator voltage signal.

The unit monitors J1939 ECU messages and provides remote start/stop control via J1939 protocol at only Trans-MiniAUTO++.CAN devices.

The unit is extensively programmable through the front panel, with password protection on two levels. Operational parameters can also be monitored and controlled from a PC via a built-in RS-232 communication port.

In the event that the engine fails to start on the first attempt, the attempt will be repeated a programmed number of times or until successful.

The unit monitors generator operation and gives warning of any faults that are detected.
If a fault is detected, the unit shuts down the engine and shows the failure message on the LCD display.

The unit has Remote Start input for remote control of the engine.

The configurable inputs can be programmed to perform 28 different functions.

Six configurable outputs can be programmed for 122 different functions.

1.2 Warranty

EMKO Elektronik warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

1.3 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

1.4 Order Information

Trans-MiniAUTO++ : Auto Start GenSet controller, LCD display
Trans-MiniAUTO++.CAN : Auto Start GenSet controller, CanBus J1939 ECU comm.
Trans-MiniAUTO++.MPU : Auto Start GenSet controller,
speed sensing from Magnetic Pickup

Note: Devices have time clock. If real time clock is needed, “RTC” expression must be added to end of order code.
Example: Trans-MiniAUTO++.MPU.RTC

2.Installation

Before beginning installation of this product, please read the instruction manual and warnings below carefully.

A visual inspection of this product for possible damage occured during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit , power off the system and seperate the electrical connection of the device from the system.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

2.1 Unit Configuration

The unit can be programmed using the buttons and LCD display on the front panel or PC Software.

2.2 Panel Mounting

The unit is designed for panel mounting. Fixing is by two screw fixings.
1- Insert the unit in the panel cut-out from the front.
2- Insert the fixings in the slotted at the corners of the unit and tighten the fixing screws to secure the unit against the panel.

During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

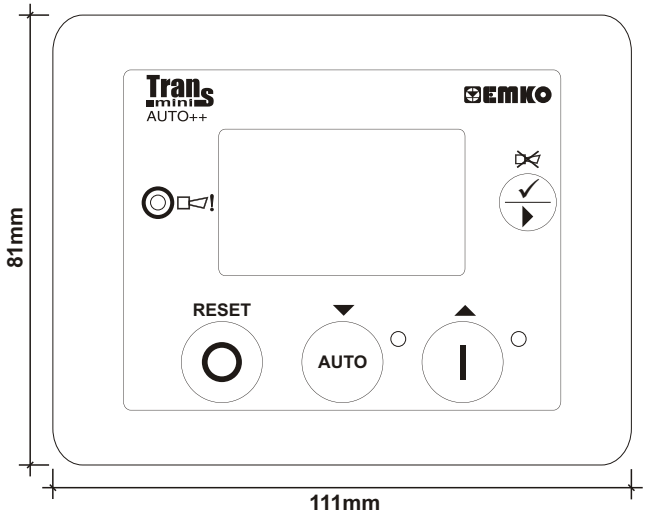


Figure 2.1 Front View

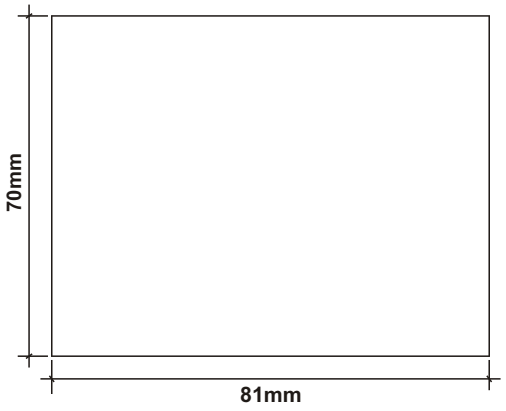
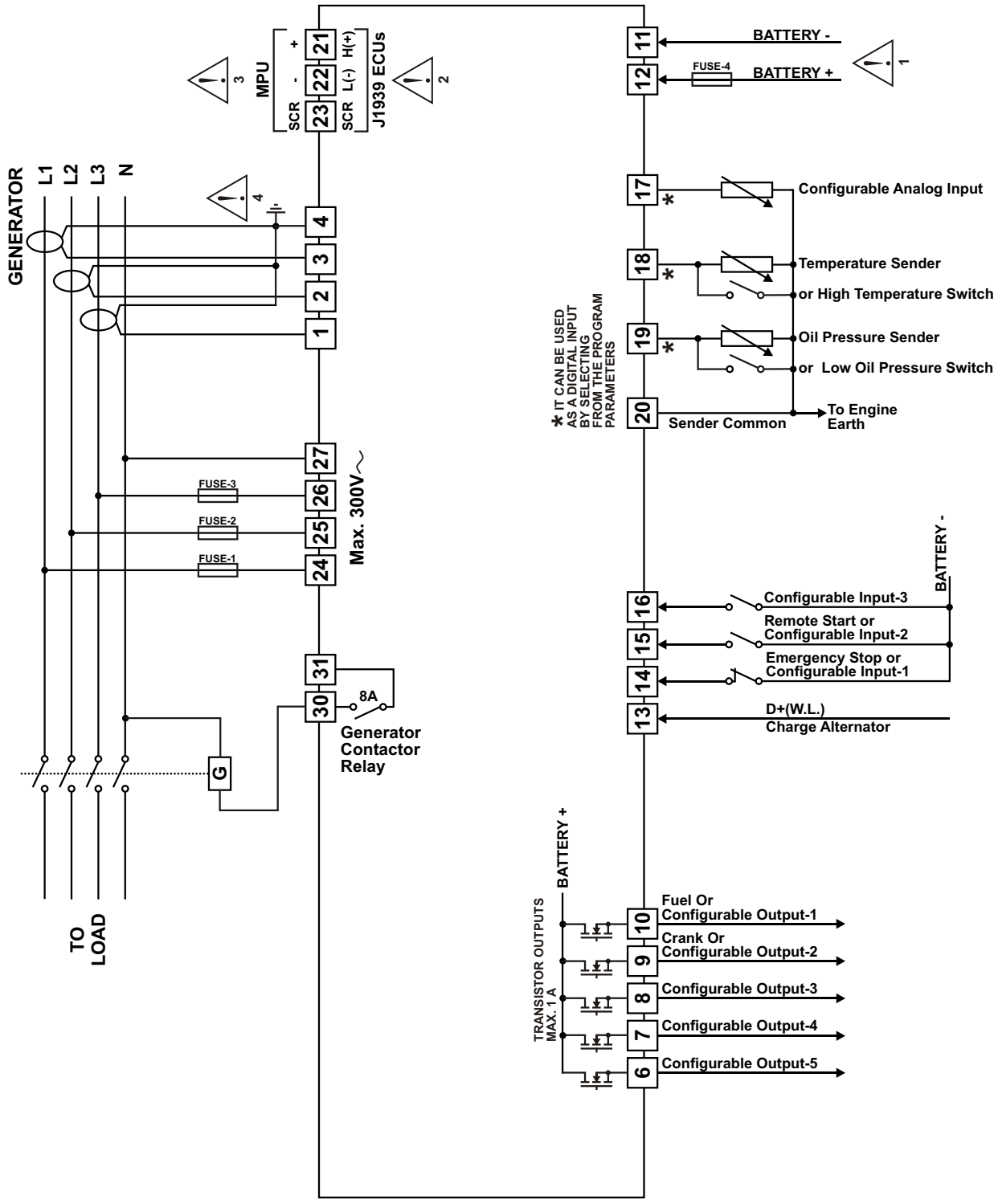


Figure 2.2 Panel Cut-Out

2.3 Electrical Connection

TRANS-MINIAUTO++ three phase connections schematic

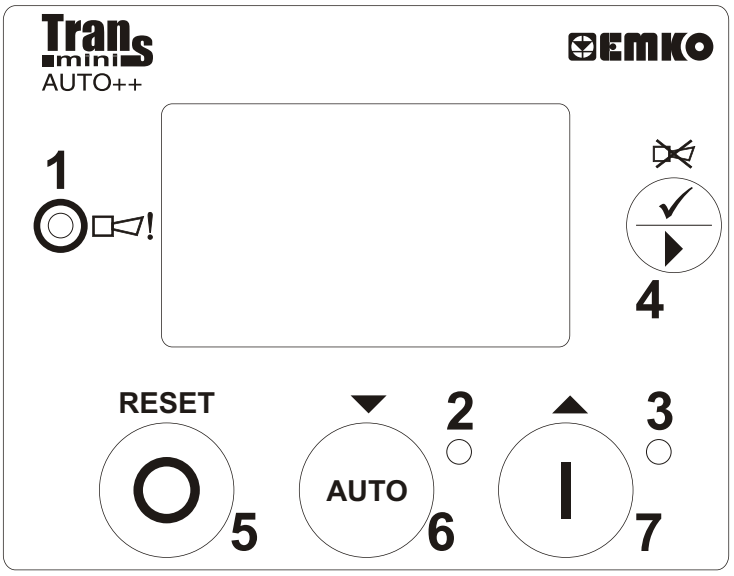


FUSE-1, FUSE-2, FUSE-3 2A.T
FUSE-4 7A.T

1- Connect the unit as shown in the appropriate diagram. Be sure to connect the battery supply the right way round and battery negative should be grounded.
2- The CAN interface requires that a 120 Ohms terminator is fitted to each end of the communications link. This termination resistor is fitted internally into the unit. So it is not required externally. The screen is grounded at one end ONLY.
3- Screened cable must be used for connecting the Magnetic Pickup, ensuring that the screen is grounded at one end ONLY.
4- Current transformers secondary should be grounded.

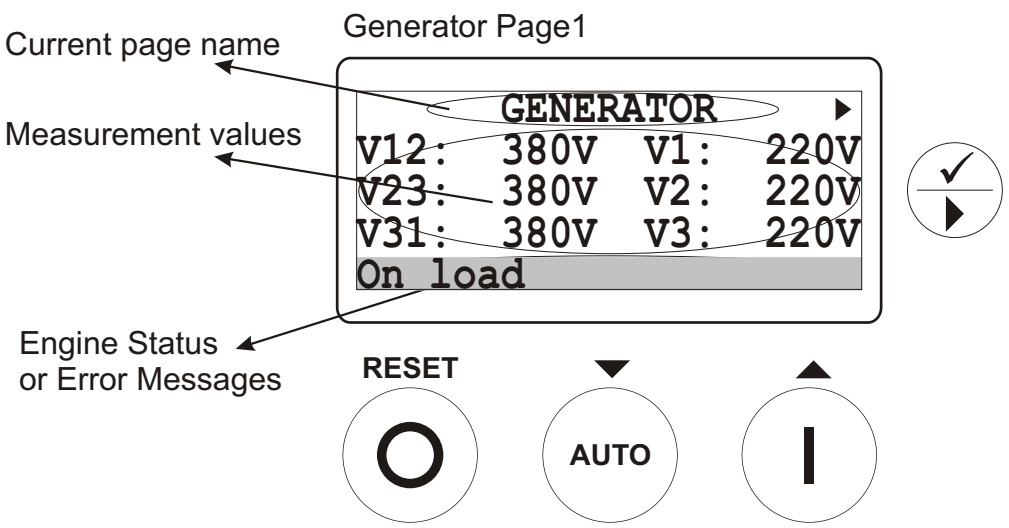
3. Front Panel Description And Accessing To The Parameters

3.1 Front Panel Description



Number	Comment
1	This LED indicates that any alarm was detected.
2	This LED shows that the unit is in the AUTO mode.
3	In the Manual and Auto modes, this LED indicates that the engine is starting up or is running.
4	This button is used for showing next page in normal operation.In Programming mode it is used for entering parameter edit section, saving parameter value and showing next parameters on the currently selected page.This button will also silence the alarm horn after a failure has been detected.
5	The RESET button will reset the controller after a failure has been detected. The STOP button is used for changing operating mode of the unit to the Stop Mode. The generator is stopped.
6	The AUTO button is used for changing operating mode of the unit to the Auto Mode. In Programming mode, it operates as an Down button (changing cursor position) or Decrement button (decrease parameter value).
7	The START button is used for starting the engine when the unit is in the Manual Mode. In Programming mode, it operates as an Up button (changing cursor position) or Increment button (increase parameter value).

LCD display Description



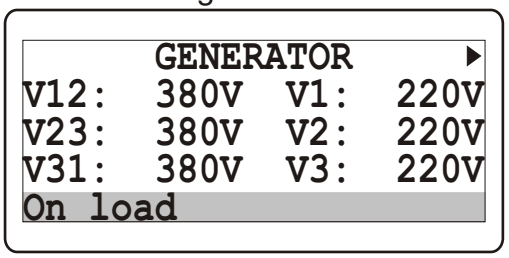
128x64 Dot-matrix LCD display.

Use the Next button to select which Data display page (screen) is to be displayed.

When enter button pressed for 2 seconds, menu options displayed.

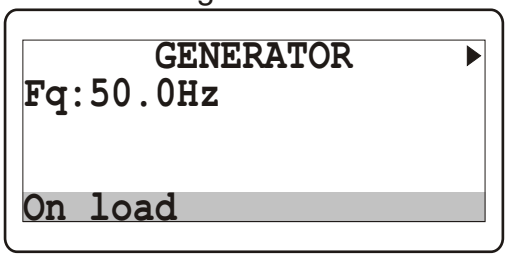
Data display pages on the LCD display;

Generator Page1:



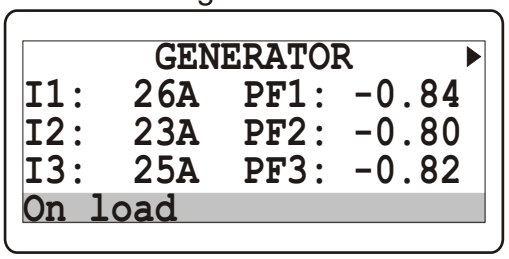
V12: Generator voltage L1-L2
V23: Generator voltage L2-L3
V31: Generator voltage L3-L1
V1: Generator voltage L1-N
V2: Generator voltage L2-N
V3: Generator voltage L3-N

Generator Page2:



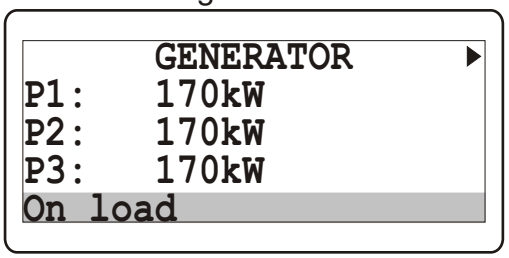
Fq: Generator frequency

Generator Page3:



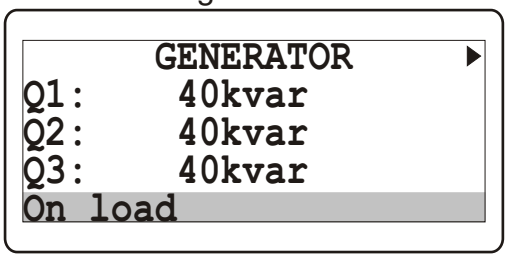
I1: Load Current L1
I2: Load Current L2
I3: Load Current L3
PF1: Generator power factor L1
PF2: Generator power factor L2
PF3: Generator power factor L3

Generator Page4:



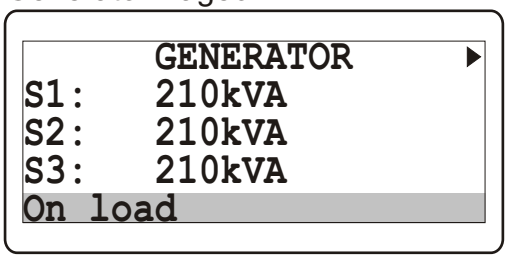
P1: Generator active power L1
P2: Generator active power L2
P3: Generator active power L3

Generator Page5:



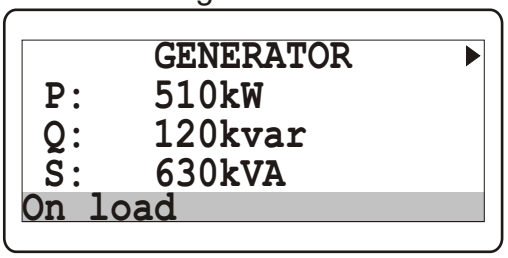
Q1: Generator reactive power L1
Q2: Generator reactive power L2
Q3: Generator reactive power L3

Generator Page6:



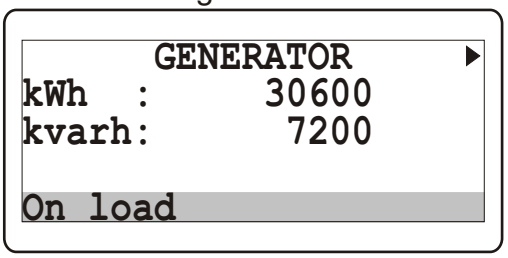
S1: Generator apparent power L1
S2: Generator apparent power L2
S3: Generator apparent power L3

Generator Page7:



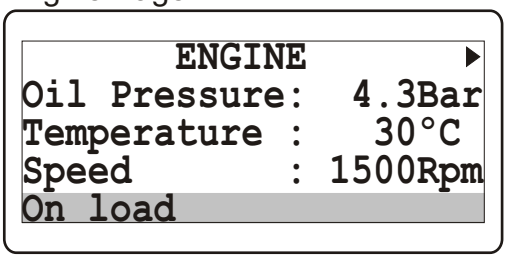
P: Generator total active power
Q: Generator total reactive power
S: Generator total apparent power

Generator Page8:



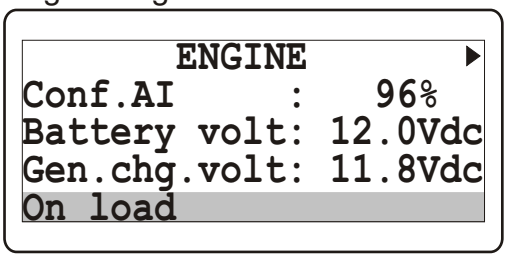
kWh: Generator active energy
kvarh: Generator reactive energy

Engine Page1:



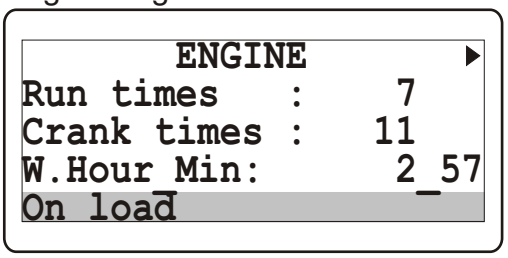
Oil pressure: Oil pressure sender input value
Temperature: Coolant temperature sender input value
Speed: Engine speed

Engine Page2:



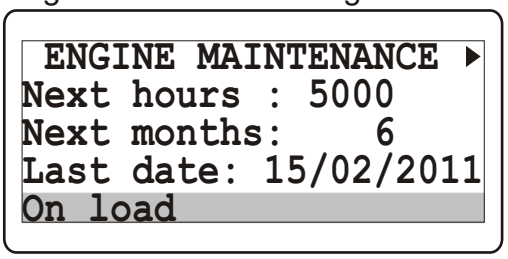
Conf. AI: Configurable Analog Input value
Battery volt: Battery supply voltage
Gen.chg.volt: Charge generator voltage

Engine Page3:



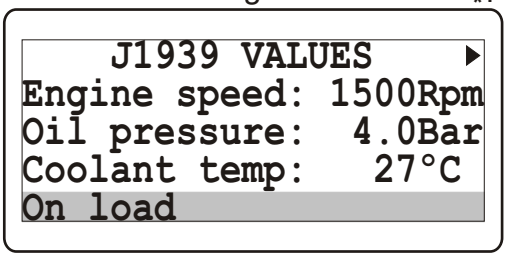
Run times: Number of generator runs
Crank times: Number of generator cranks
W.Hour_Min: Engine running time (Hour and Minute)

Engine Maintenance Page:



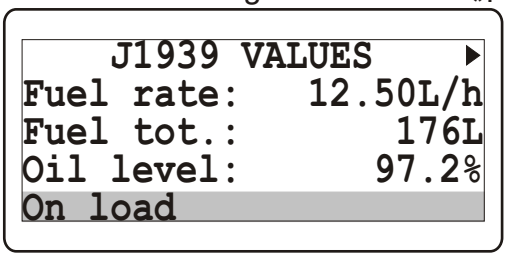
Next hours: The remaining hour for maintenance
Next months: The remaining month for maintenance
Last date: The last maintenance date

J1939 Values Page1: *1



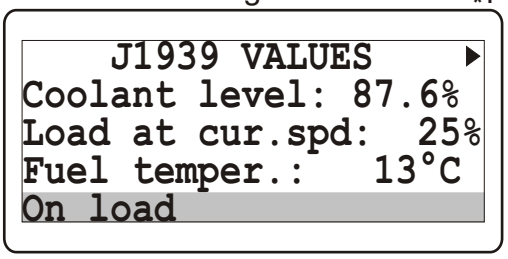
Engine speed: Engine speed via J1939
Oil pressure: Oil pressure via J1939
Coolant temp: Coolant temperature via J1939

J1939 Values Page2: *1



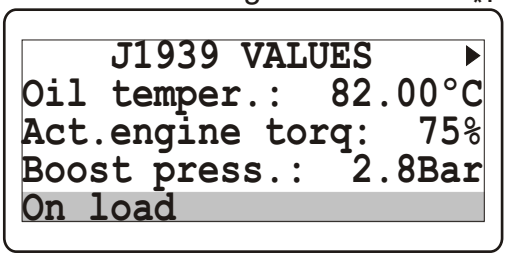
Fuel rate: Fuel rate via J1939
Fuel tot.: Fuel total used via J1939
Oil level: Oil level via J1939

J1939 Values Page3: *1



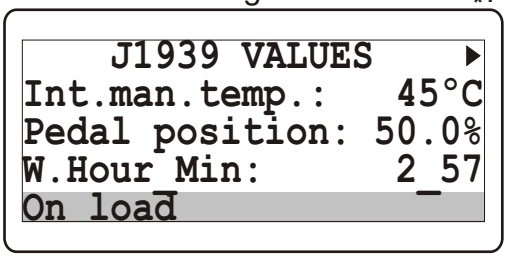
Coolant level: Coolant level via J1939
Load at cur.spd: Load at current speed via J1939
Fuel temper.: Fuel temperature via J1939

J1939 Values Page4: *1



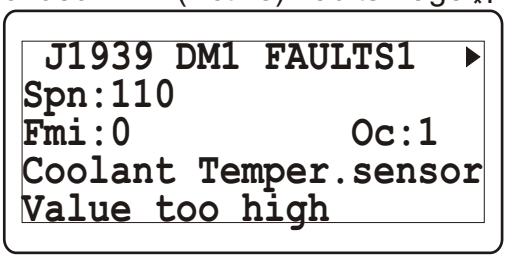
Oil temper.: Oil temperature via J1939
Act.engine torq: Actual engine torque via J1939
Boost press.: Boost pressure via J1939

J1939 Values Page5: *1



Int.man.temp.: Intake manifold temperature via J1939
Pedal position: Accelerator pedal position via J1939
W.Hour_Min: Working hour and minute via J1939

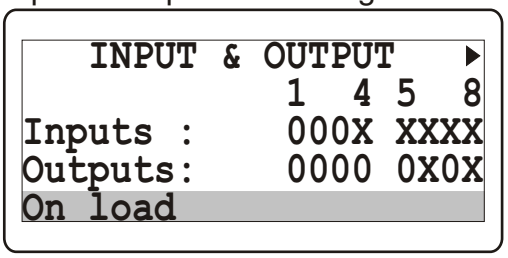
J1939 DM1 (Active) Faults Page: *1



Spn: Suspect parameter number (e.g. SPN = 110 corresponds to coolant temperature sensor)
Fmi: Failure mode identifier (e.g. FMI = 0 means value too high)
Oc: Occurrence count (if OC = 0, no alarm is present)
The first 10 active alarm messages (Active Diagnostic Trouble Codes - DM1) with SPN, FMI, and OC are displayed). If more than one active fault condition is present, all of them is displayed sequencely by pressing Next and Previous buttons.

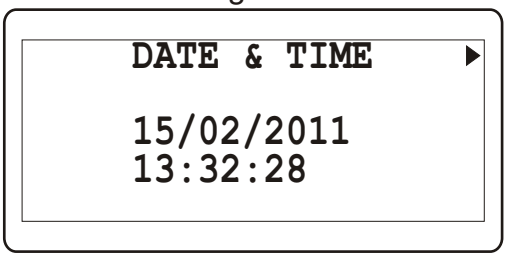
Note: *1 = These J1939 pages are only available at Trans-MiniAUTO++.CAN

Input & Output Status Page:



Inputs: Input status information. If an input is active, related digit is displayed as "1" else it is displayed as "0".
1: Conf. in-1, **2:** Conf. in-2, **3:** Conf. in-3, **4:** Not available,
5: Not available, **6:** Not available, **7:** Not available, **8:** Not available
Outputs: Output status information. If an output is active, related digit is displayed as "1" else it is displayed as "0".
1: Conf. out-1, **2:** Conf. out-2, **3:** Conf. out-3, **4:** Conf. out-4,
5: Conf. out-5, **6:** Not available, **7:** Generator contactor, **8:** Not available.

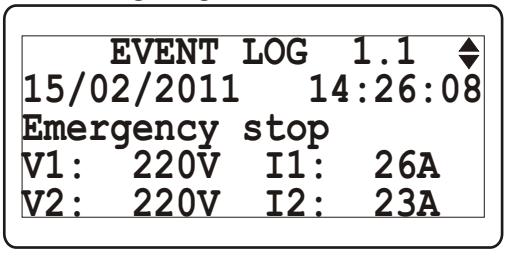
Date & Time Page:



Date: Day, Month, Year.
Time: Hour, minute, second.

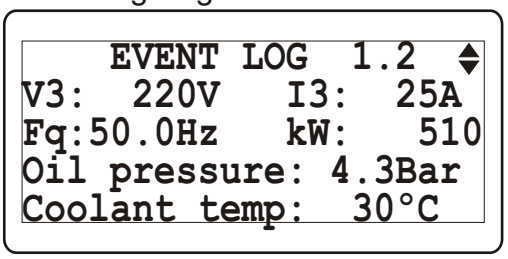
Event Log display pages on the LCD display;

Event Log Page1:



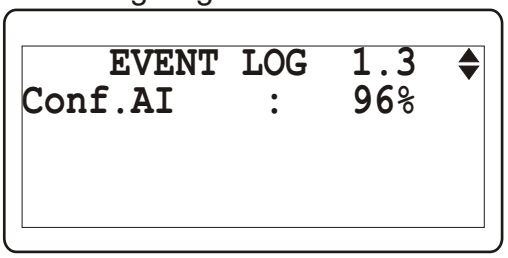
1.1: The first page of related event log
Emergency stop: This message indicates that an emergency stop alarm has occurred. (Event history: 15/02/2011 date, 14:26:08 time).
V1: Generator voltage L1-N
I1: Load Current L1
V2: Generator voltage L2-N
I2: Load Current L2

Event Log Page2:



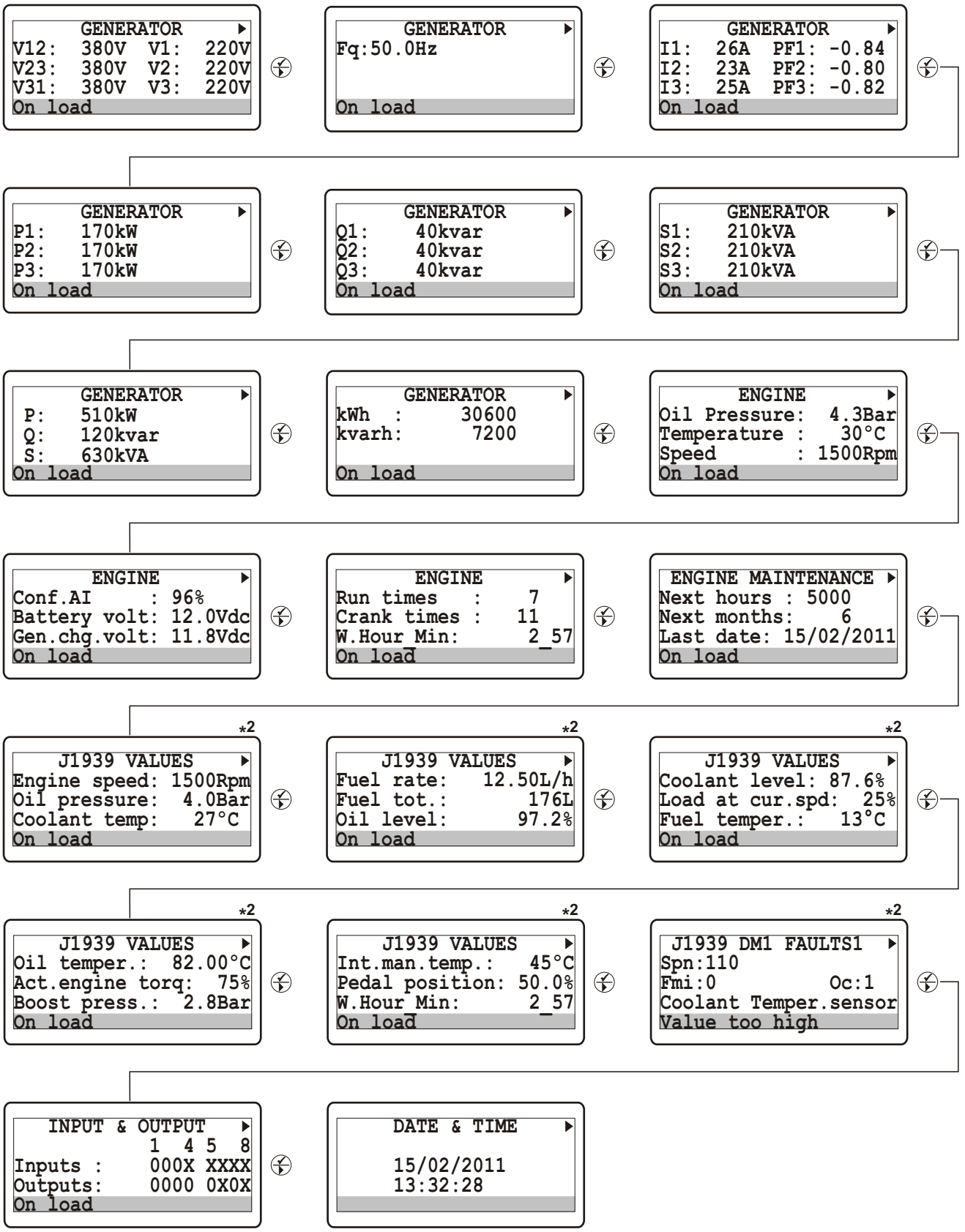
1.2: The second page of related event log
V3: Generator voltage L3-N
I3: Load Current L3
Fq: Generator frequency
kW: Generator total active power
Oil oressure: Oil pressure sender input value
Coolant temp: Coolant temperature sender input value

Event Log Page3:



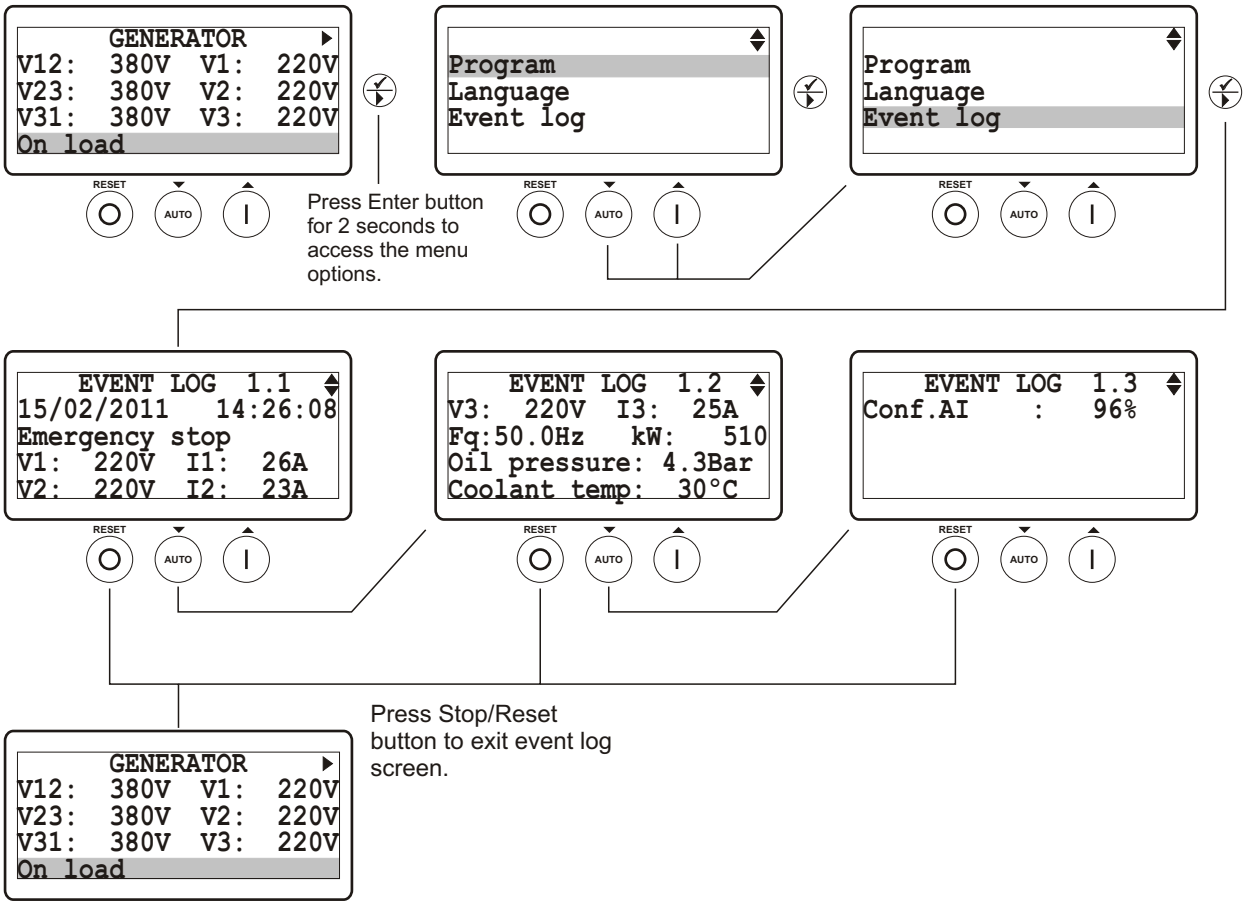
1.3: The last page of related event log
Conf. AI: Configurable Analog Input value

Example-1: Displaying all Data display pages.

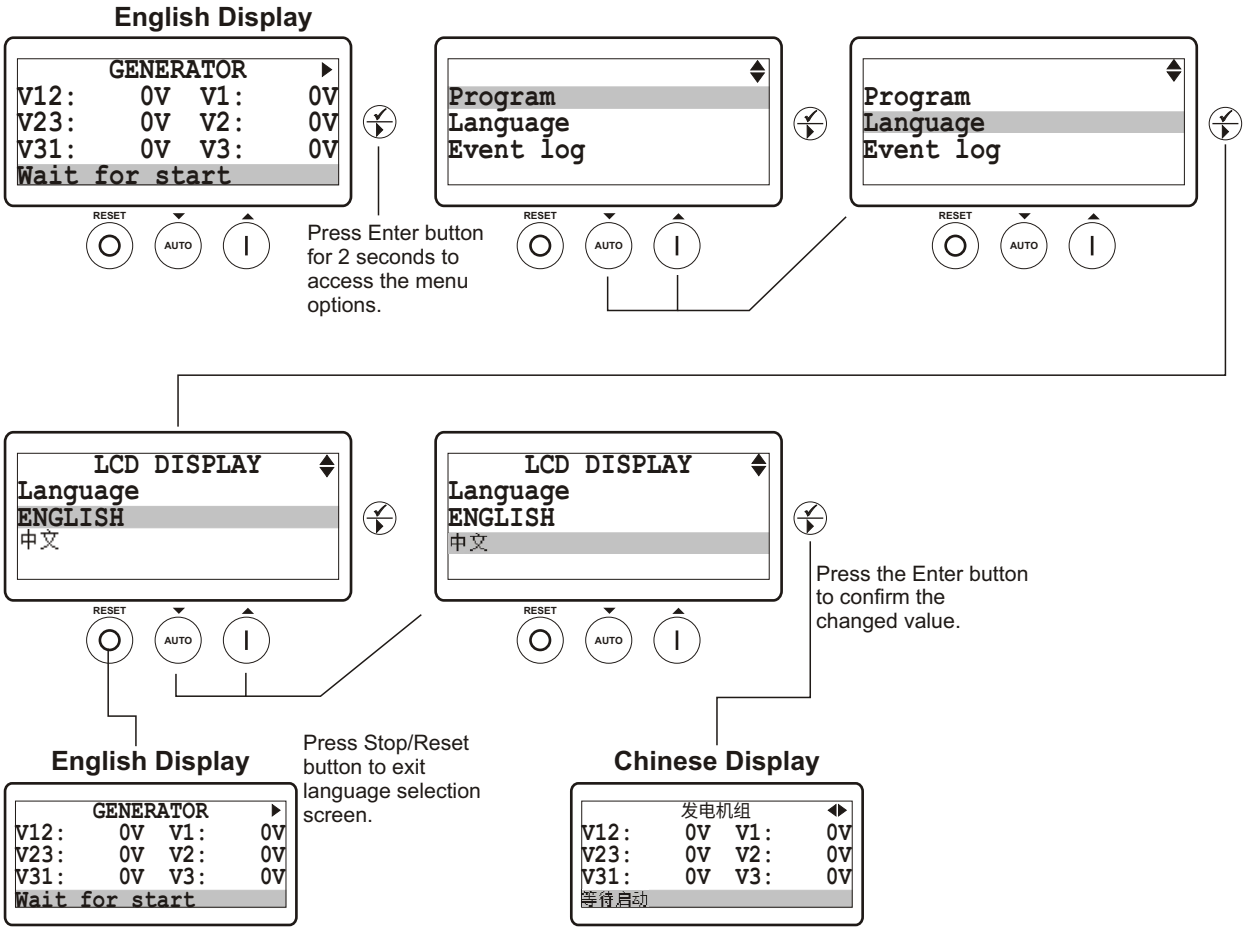


Note: *2 = These J1939 pages are only available at Trans-MiniAUTO++.CAN

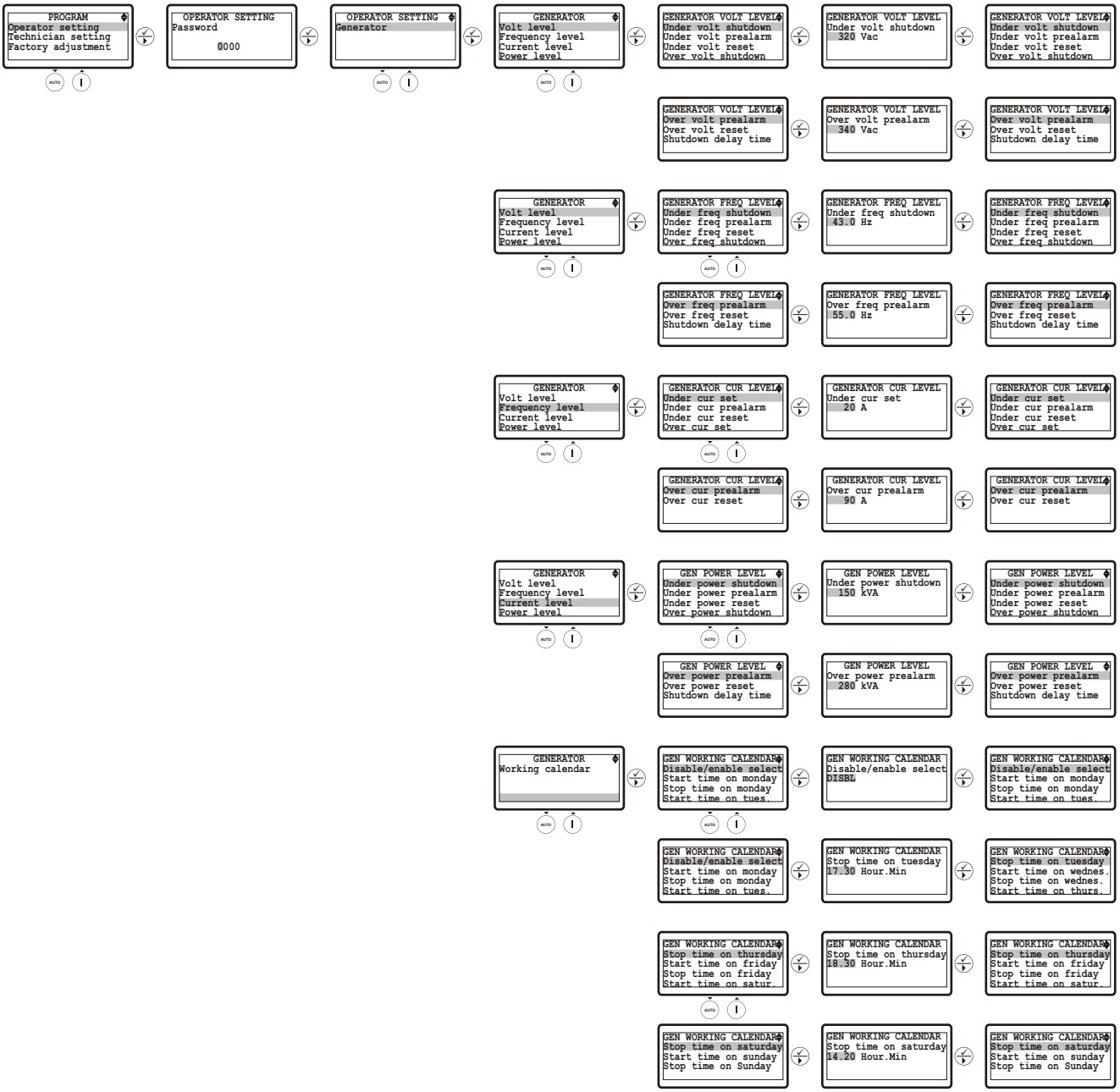
Example-2: Displaying all Event Log display pages



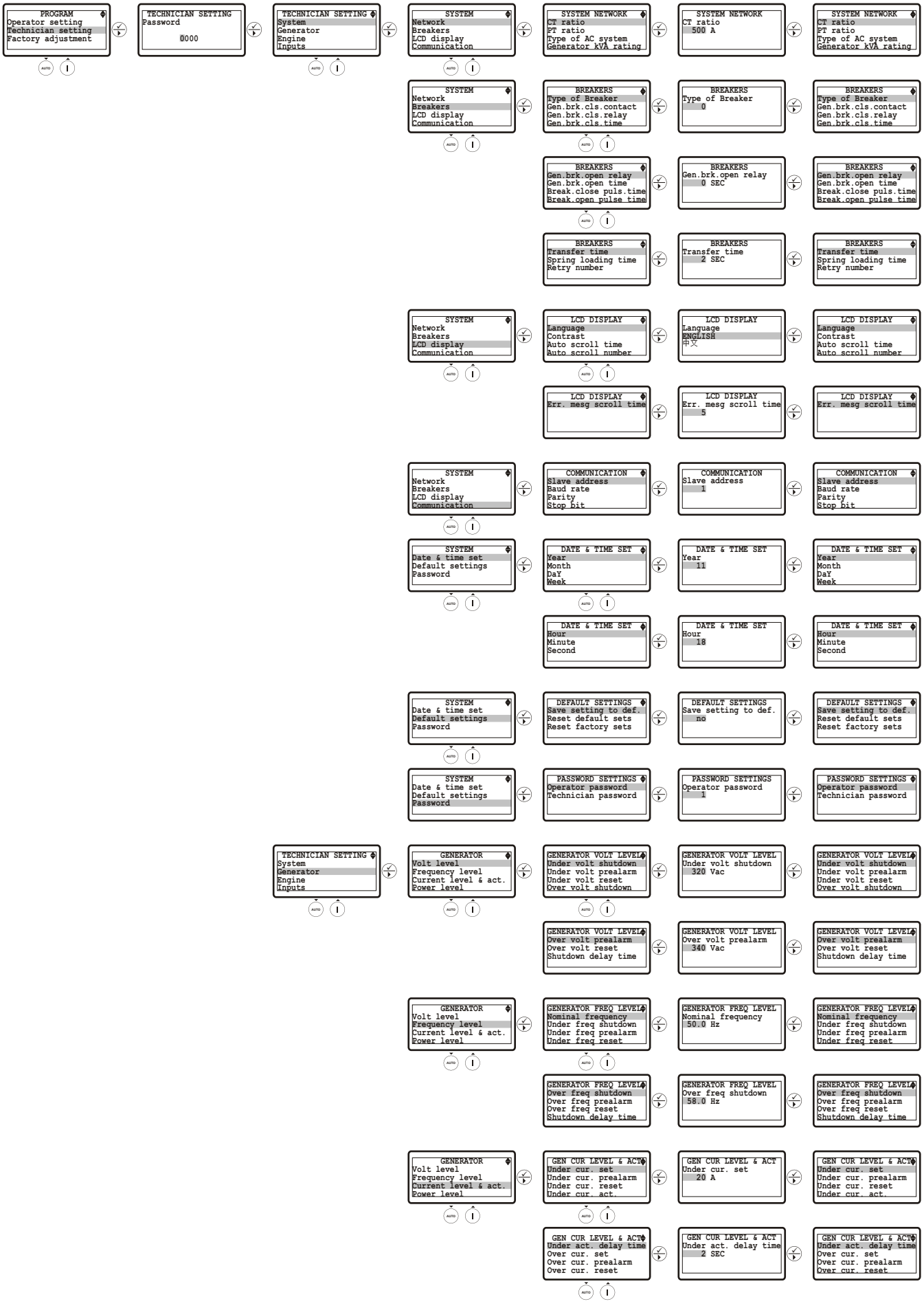
LCD display language selection

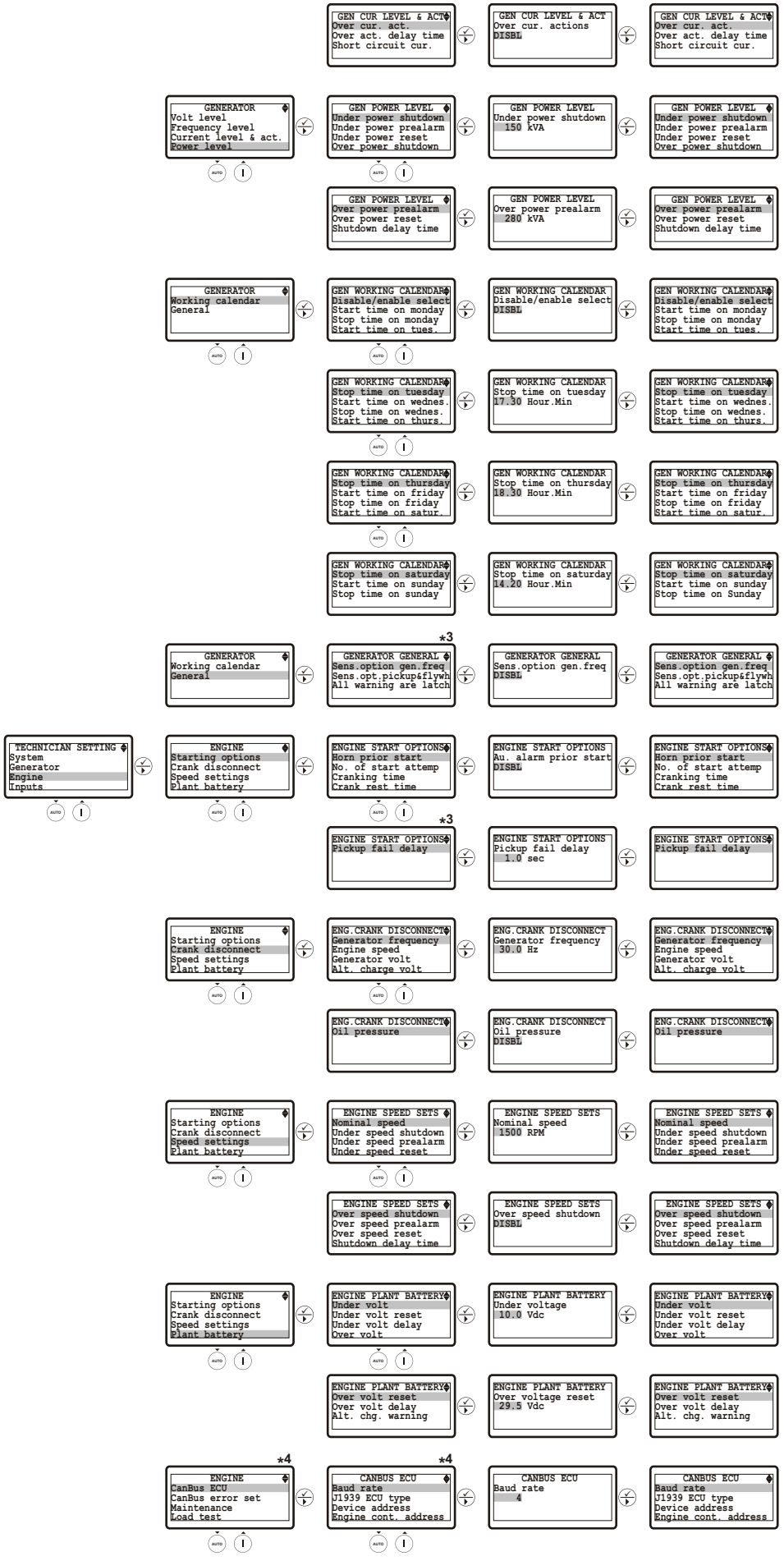


3.2 Accessing To The Operator Parameters

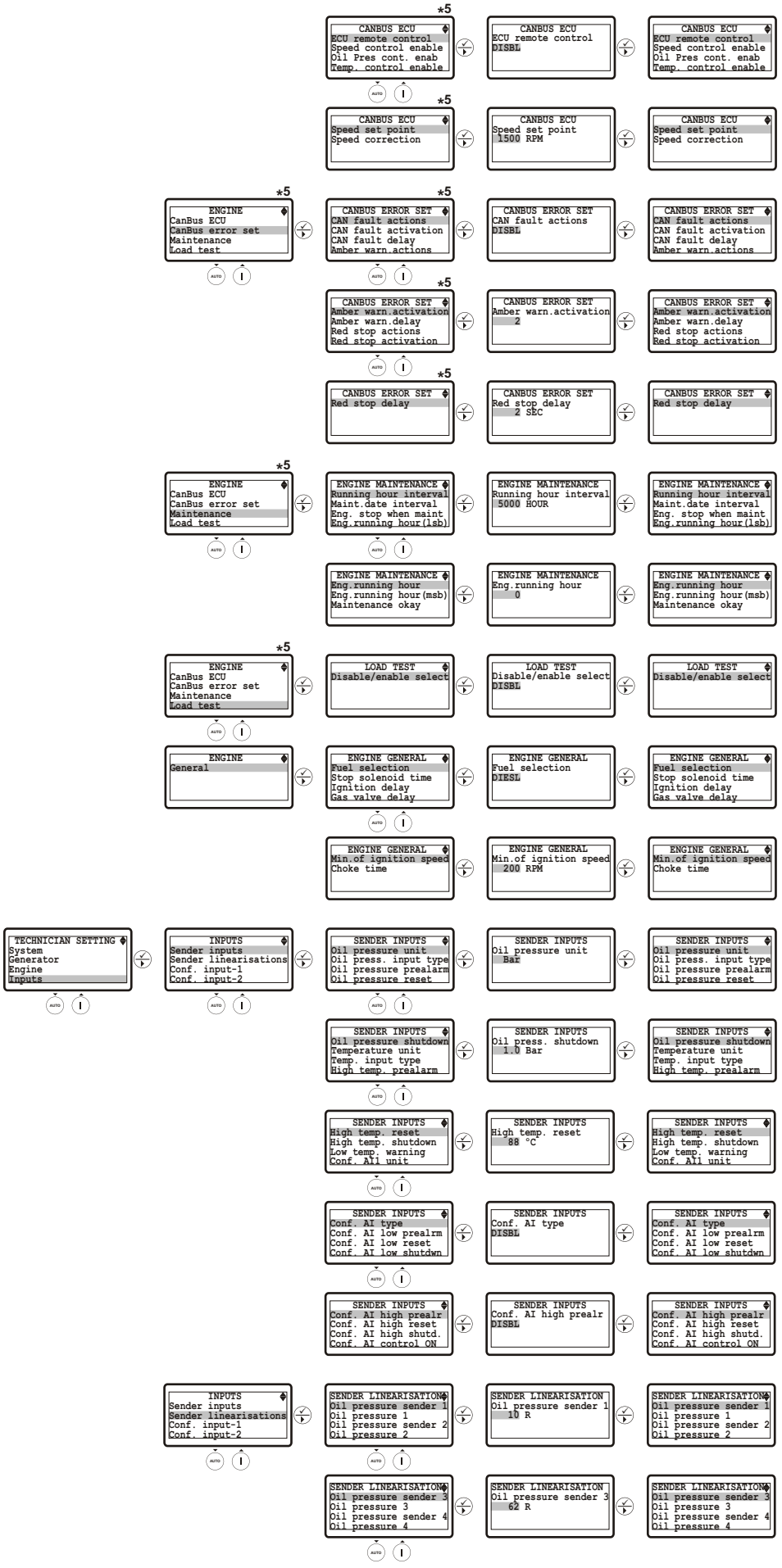


3.3 Accessing To The Technician Parameters

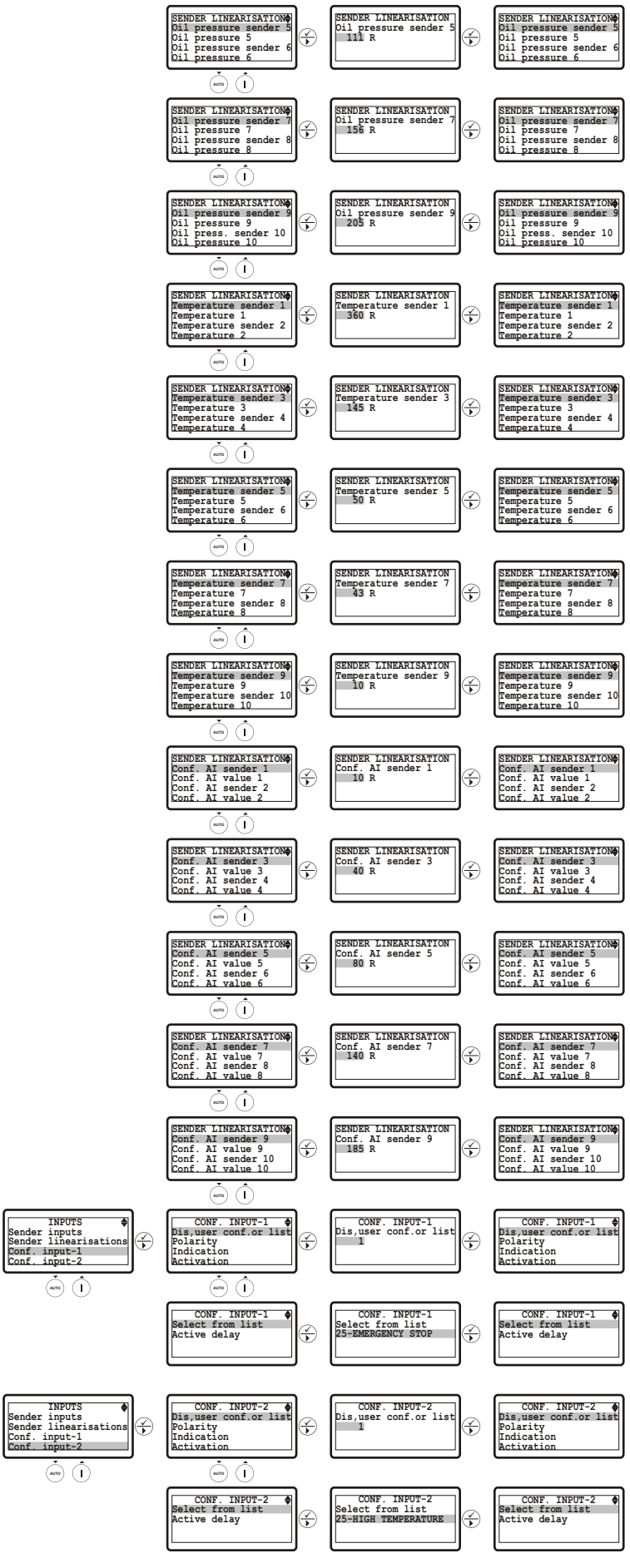


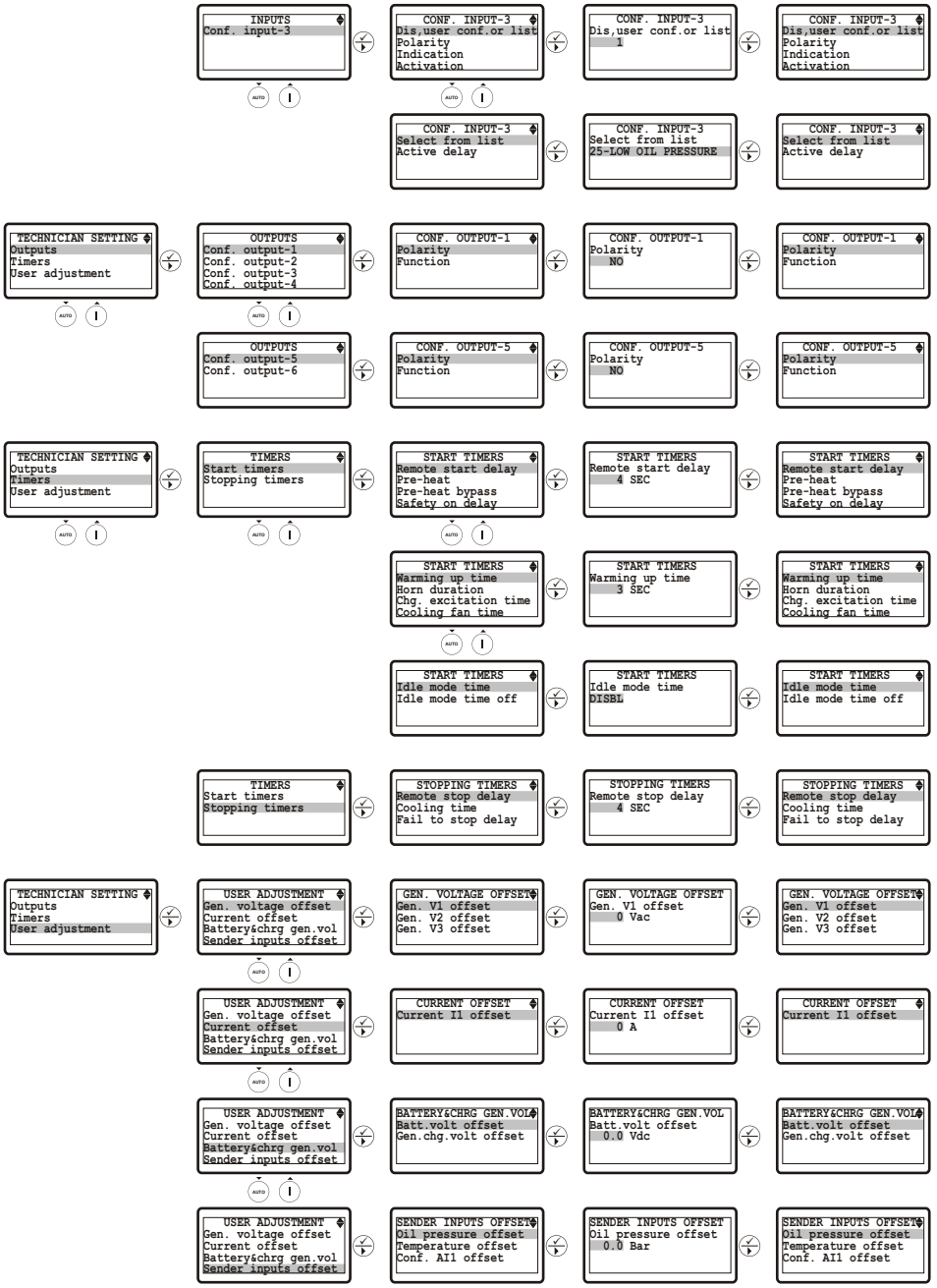


Note: *3 = “Sens.opt.pickup&flywh” and “Pickup fail delay” parameters are only available at Trans-MiniAUTO++.MPU
*4 = “CanBus ECU” and “CanBus error set” parameter pages are only available at Trans-MiniAUTO++.CAN

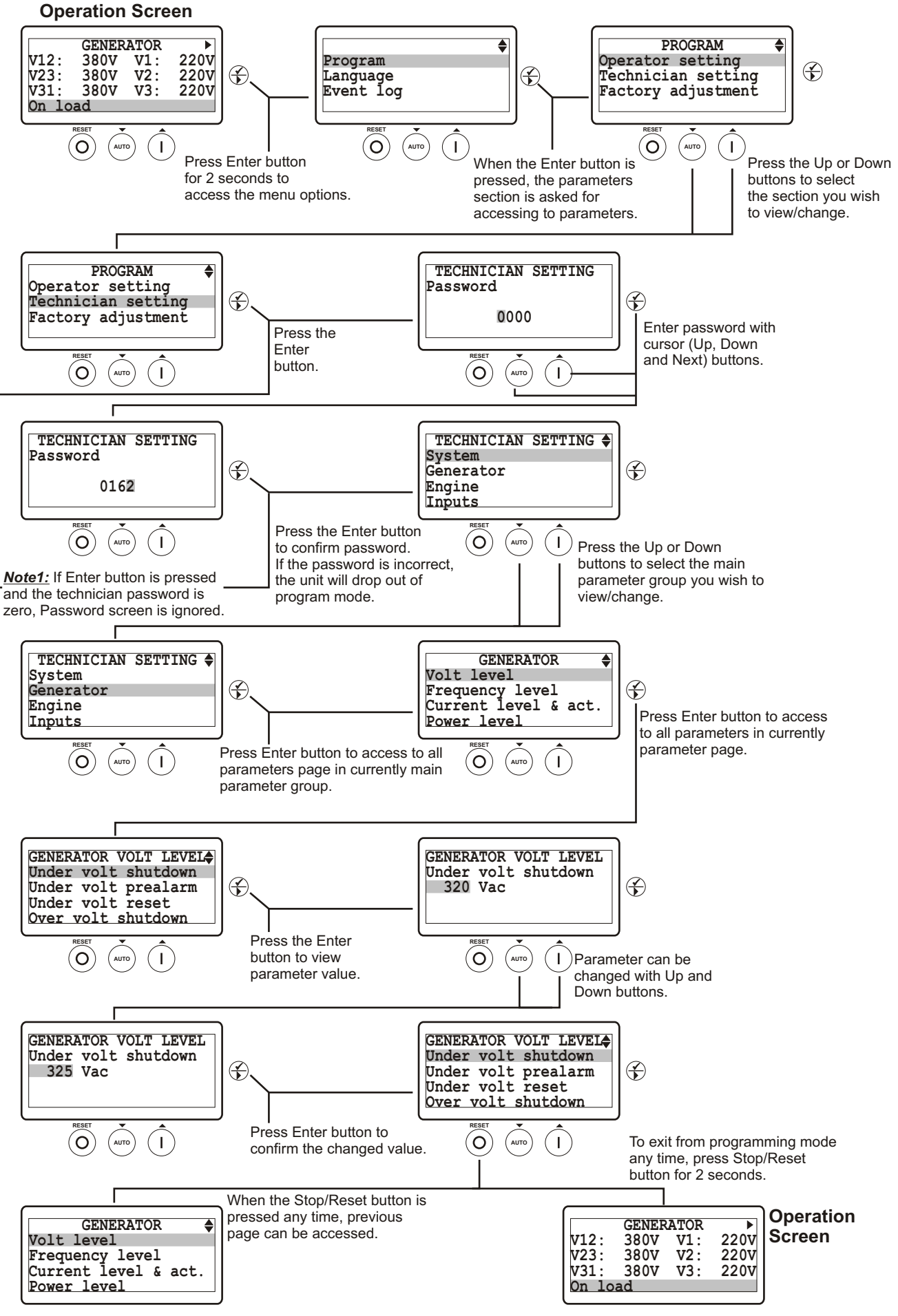


Note: *5 = “CanBus ECU” and “CanBus error set” parameter pages are only available at Trans-MiniAUTO++.CAN


SENDER LINEARISATION
Oil pressure sender 5
Oil pressure 5
Oil pressure sender 6
Oil pressure 6
Oil pressure sender 5
111 R
Oil pressure sender 7
Oil pressure 7
Oil pressure sender 8
Oil pressure 8
Oil pressure sender 7
156 R
Oil pressure sender 9
Oil pressure 9
Oil press. sender 10
Oil pressure 10
Oil pressure sender 9
205 R
Temperature sender 1
Temperature 1
Temperature sender 2
Temperature 2
Temperature sender 1
360 R
Temperature sender 3
Temperature 3
Temperature sender 4
Temperature 4
Temperature sender 3
145 R
Temperature sender 5
Temperature 5
Temperature sender 6
Temperature 6
Temperature sender 5
50 R
Temperature sender 7
Temperature 7
Temperature sender 8
Temperature 8
Temperature sender 7
43 R
Temperature sender 9
Temperature 9
Temperature sender 10
Temperature 10
Temperature sender 9
10 R
Conf. AI sender 1
Conf. AI value 1
Conf. AI sender 2
Conf. AI value 2
Conf. AI sender 1
10 R
Conf. AI sender 3
Conf. AI value 3
Conf. AI sender 4
Conf. AI value 4
Conf. AI sender 3
40 R
Conf. AI sender 5
Conf. AI value 5
Conf. AI sender 6
Conf. AI value 6
Conf. AI sender 5
80 R
Conf. AI sender 7
Conf. AI value 7
Conf. AI sender 8
Conf. AI value 8
Conf. AI sender 7
140 R
Conf. AI sender 9
Conf. AI value 9
Conf. AI sender 10
Conf. AI value 10
Conf. AI sender 9
185 R
INPUTS
Sender inputs
Sender linearisations
Conf. input-1
Conf. input-2
CONF. INPUT-1
Dis,user conf.or list
Polarity
Indication
Activation
Dis,user conf.or list
1
Select from list
Active delay
Select from list
25-EMERGENCY STOP
CONF. INPUT-2
Dis,user conf.or list
Polarity
Indication
Activation
Dis,user conf.or list
1
Select from list
Active delay
Select from list
25-HIGH TEMPERATURE


INPUTS
Conf. input-3
CONF. INPUT-3
Dis,user conf.or list
Polarity
Indication
Activation
CONF. INPUT-3
Dis,user conf.or list
1
CONF. INPUT-3
Dis,user conf.or list
Polarity
Indication
Activation
CONF. INPUT-3
Select from list
Active delay
CONF. INPUT-3
Select from list
25-LOW OIL PRESSURE
CONF. INPUT-3
Select from list
Active delay
TECHNICIAN SETTING
Outputs
Timers
User adjustment
OUTPUTS
Conf. output-1
Conf. output-2
Conf. output-3
Conf. output-4
CONF. OUTPUT-1
Polarity
Function
CONF. OUTPUT-1
Polarity
NO
CONF. OUTPUT-1
Polarity
Function
OUTPUTS
Conf. output-5
Conf. output-6
CONF. OUTPUT-5
Polarity
Function
CONF. OUTPUT-5
Polarity
NO
CONF. OUTPUT-5
Polarity
Function
TECHNICIAN SETTING
Outputs
Timers
User adjustment
TIMERS
Start timers
Stopping timers
START TIMERS
Remote start delay
Pre-heat
Pre-heat bypass
Safety on delay
START TIMERS
Remote start delay
4 SEC
START TIMERS
Remote start delay
Pre-heat
Pre-heat bypass
Safety on delay
START TIMERS
Warming up time
Horn duration
Chg. excitation time
Cooling fan time
START TIMERS
Warming up time
3 SEC
START TIMERS
Warming up time
Horn duration
Chg. excitation time
Cooling fan time
START TIMERS
Idle mode time
Idle mode time off
START TIMERS
Idle mode time
DISBL
START TIMERS
Idle mode time
Idle mode time off
TIMERS
Start timers
Stopping timers
STOPPING TIMERS
Remote stop delay
Cooling time
Fail to stop delay
STOPPING TIMERS
Remote stop delay
4 SEC
STOPPING TIMERS
Remote stop delay
Cooling time
Fail to stop delay
TECHNICIAN SETTING
Outputs
Timers
User adjustment
USER ADJUSTMENT
Gen. voltage offset
Current offset
Battery&chrg gen.vol
Sender inputs offset
GEN. VOLTAGE OFFSET
Gen. V1 offset
Gen. V2 offset
Gen. V3 offset
GEN. VOLTAGE OFFSET
Gen. V1 offset
0 Vac
GEN. VOLTAGE OFFSET
Gen. V1 offset
Gen. V2 offset
Gen. V3 offset
USER ADJUSTMENT
Gen. voltage offset
Current offset
Battery&chrg gen.vol
Sender inputs offset
CURRENT OFFSET
Current I1 offset
CURRENT OFFSET
Current I1 offset
0 A
CURRENT OFFSET
Current I1 offset
USER ADJUSTMENT
Gen. voltage offset
Current offset
Battery&chrg gen.vol
Sender inputs offset
BATTERY&CHRG GEN.VOL
Batt.volt offset
Gen.chg.volt offset
BATTERY&CHRG GEN.VOL
Batt.volt offset
0.0 Vdc
BATTERY&CHRG GEN.VOL
Batt.volt offset
Gen.chg.volt offset
USER ADJUSTMENT
Gen. voltage offset
Current offset
Battery&chrg gen.vol
Sender inputs offset
SENDER INPUTS OFFSET
Oil pressure offset
Temperature offset
Conf. AI1 offset
SENDER INPUTS OFFSET
Oil pressure offset
0.0 Bar
SENDER INPUTS OFFSET
Oil pressure offset
Temperature offset
Conf. AI1 offset

3.4 Changing And Saving Parameters Values



4. Parameters

4.1 Operator Parameters

4.1.1 Generator

GENERATOR VOLT LEVEL (*Generator->Volt level*)		Min	Max	Default	Unit
Under volt shutdown	Generator Under Voltage Shutdown	60(dis)	600	320	V~
Under volt prealarm	Generator Under Voltage Pre-Alarm	60(dis)	600	340	V~
Under volt reset	Generator Under Voltage Pre-Alarm Reset	60	600	350	V~
Over volt shutdown	Generator Over Voltage Shutdown	60	600	440	V~
Over volt prealarm	Generator Over Voltage Pre-Alarm	60(dis)	600	420	V~
Over volt reset	Generator Over Voltage Pre-Alarm Reset	60	600	400	V~
Shutdown delay time	Generator Voltage Shutdown Delay Time	0.0	10.0	1.0	Sec

GENERATOR FREQ LEVEL (*Generator->Frequency level*)		Min	Max	Default	Unit
Nominal frequency	Nominal Alternator Frequency	30.0	75.0	50.0	Hz
Under freq shutdown	Generator Under Frequency Shutdown	30.0(dis)	75.0	43.0	Hz
Under freq prealarm	Generator Under Frequency Pre-Alarm	30.0(dis)	75.0	45.0	Hz
Under freq reset	Generator Under Frequency Pre-Alarm Reset	30.0	75.0	46.0	Hz
Over freq shutdown	Generator Over Frequency Shutdown	30.0(dis)	75.0	58.0	Hz
Over freq prealarm	Generator Over Frequency Pre-Alarm	30.0(dis)	75.0	55.0	Hz
Over freq reset	Generator Over Frequency Pre-Alarm Reset	30.0	75.0	54.0	Hz
Shutdown delay time	Generator Frequency Shutdown Delay Time	0.0	10.0	1.0	Sec

GENERATOR CUR LEVEL (*Generator->Current level*)		Min	Max	Default	Unit
Under cur. set	Generator Under Current Set	0	9999	1	A~
Under cur. prealarm	Generator Under Current Pre-Alarm	0(dis)	9999	dis	A~
Under cur. reset	Generator Under Current Pre-Alarm Reset	0	9999	5	A~
Over cur. set	Generator Over Current Set	0	9999	9999	A~
Over cur. prealarm	Generator Over Current Pre-Alarm	0(dis)	9999	9990	A~
Over cur. reset	Generator Over Current Pre-Alarm Reset	0	9999	9980	A~

GEN POWER LEVEL (*Generator->Power level*)		Min	Max	Default	Unit
Under power shutdown	Generator Under Power Shutdown	0(dis)	9999	dis	kVA
Under power prealarm	Generator Under Power Pre-Alarm	0(dis)	9999	dis	kVA
Under power reset	Generator Under Power Pre-Alarm Reset	0	9999	5	kVA
Over power shutdown	Generator Over Power Shutdown	0(dis)	9999	dis	kVA
Over power prealarm	Generator Over Power Pre-Alarm	0(dis)	9999	dis	kVA
Over power reset	Generator Over Power Pre-Alarm Reset	0	9999	0	kVA
Shutdown delay time	Generator Power Shutdown Delay Time	0	99	2	Sec

Note: dis = disable

4.2 Technician Parameters

4.2.1 System

SYSTEM NETWORK (*System->Network*)		Min	Max	Default	Unit
CT ratio	Current Ratio	5	9999	100	A~
PT ratio	Voltage Transformer Ratio	1	50	1	
Type of AC system	Select AC system; 0- 1 Phase 2 Wire 1- 3 Phase 4 Wire	0	2	1	
Generator kVA rating	Generator kVA rating set	0	9999	300	kVA

CT ratio
Load current transformers transfer ratio(Primary current/Secondary current) value must be entered to this parameter.

Example:
If Current Transformer Primary=500A and Current Transformer Secondary=5A, Current Transformer Ratio should be entered CT Primary/CT Secondary=100.

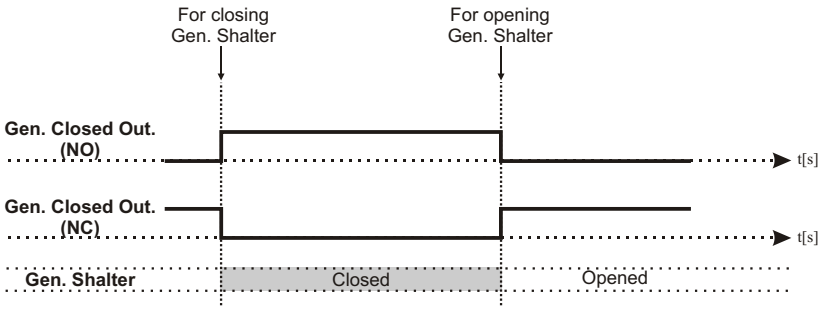
PT ratio
Defines the scaling factor applied to voltage readout and associated fault conditions.
This PT ratio is for additional voltage transformers mounted the unit.

BREAKERS (*System->Breakers*)		Min	Max	Default	Unit
Type of Breaker	Hardware Breaker Selection	0	2	0	
Gen.brk.cls.contact	Gen Close Breaker Contact Type	NO / NC		0	
Gen.brk.cls.relay	Gen Close Breaker Relay Type	NOR / PULS		0	
Gen.brk.cls.time	Gen Close Timer	1	250	5	Sec
Gen.brk.open relay	Gen Open Breaker Relay Type	NOR / PULS		0	
Gen.brk.open time	Gen Open Timer	1	250	5	Sec
Break.close puls.time	Breaker Close Pulse Time	0.0	10.0	0.5	Sec
Break.open pulse time	Breaker Open Pulse Time	0.0	10.0	0.5	Sec
Transfer time	Transfer Time	0	250	2	Sec
Spring loading time	Spring Loading Time	1	250	3	Sec
Retry number	Retry Number	1	250	5	

Hardware Breaker Selection
0- Gen schalter has only close drive and if close drive off schalter will open.
Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN TIMER(if gen closed input selected), TRANSFER TIME.

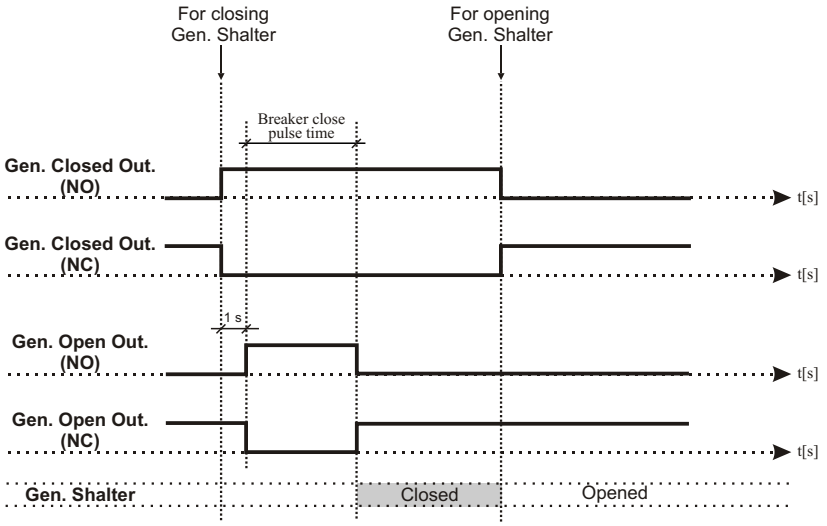
Note-1 : NO / NC : Normally Open / Normally Close
2 : NOR / PULS : Normal / Pulse

Example: If Hardware Breaker Selection parameter is selected as 0;



1- Gen schalter has only close drive, when want to schalter close, close breaker output on and after 1 sec. open breaker output on and after breaker close pulse time open breaker output will off. When want to schalter open close breaker output and open breaker output will off.
Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN TIMER(if gen closed input selected), BREAKER CLOSE PULSE TIME, TRANSFER TIME.

Example: If Hardware Breaker Selection parameter is selected as 1;

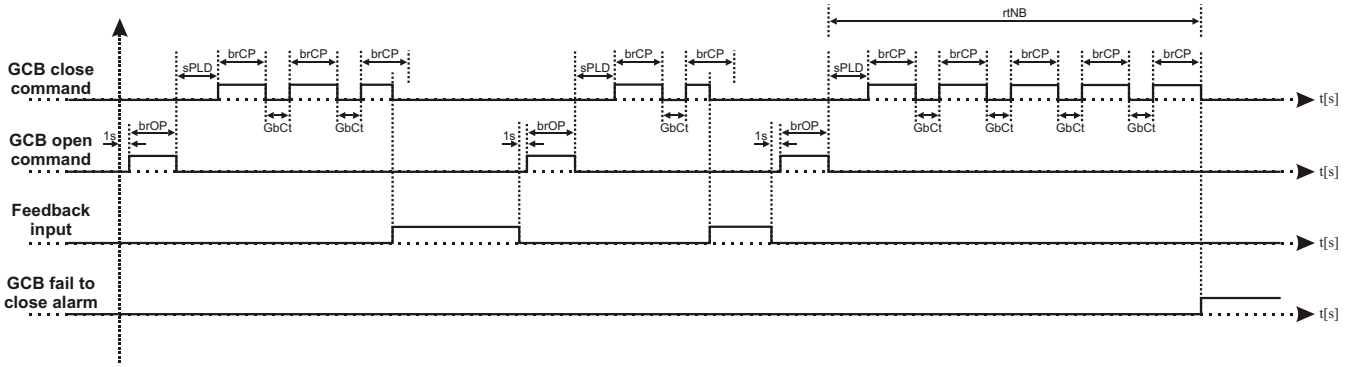


2- USER CONFIGURED: User can select all the schalter types. Used for Motorised Schalters.

Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE BREAKER RELAY TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN BREAKER RELAY TYPE, GEN OPEN TIMER(if gen closed input selected), BREAKER CLOSE PULSE TIME(if Gen Close Breaker Relay Type or Main Close Breaker Relay Type parameter is selected as 1), BREAKER OPEN PULSE TIME(if Gen Open Breaker Relay Type or Main Open Breaker Relay Type parameter is selected as 1), TRANSFER TIME, SPRING LOADING TIME, RETRY NUMBER.

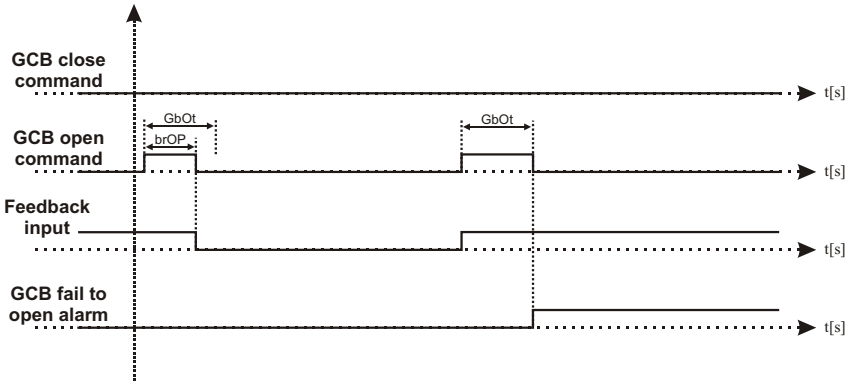
Example-1: GCB Close Diagram.
If Hardware Breaker Selection parameter is selected as 2 (user configured), Gen. Close Breaker Relay Type parameter is selected as 1 (PULSE) and Gen. Open Breaker Relay Type parameter is selected as 1 (PULSE);

GbCt: Gen close timer
brCP: Breaker close pulse time
brOP: Breaker open pulse time
sPLD: Spring loading time
rtNB: Retry number



Example-2: GCB Open Diagram.
If Hardware Breaker Selection parameter is selected as 2 (user configured), Gen. Close Breaker Relay Type parameter is selected as 1 (PULSE) and Gen. Open Breaker Relay Type parameter is selected as 1 (PULSE);

GbOt: Gen open timer
brOP: Breaker open pulse time



Gen Close Timer
This is used to monitor the closure of the generator contactor or breaker. It will only operate if an auxiliary input is configured as 'Generator Closed Auxiliary' and connected to the auxiliary on the generator contactor or breaker. Once a generator closed signal is issued the 'gen close timer' is initiated. Should the 'Generator Closed Auxiliary' input become active the timer the 'gen close timer' is cancelled. If the timer expires and the 'Generator Closed Auxiliary' has not become active the module will issue a 'generator failed to close' alarm.

Gen Open Timer
This is used to monitor the opening of the generator contactor or breaker. It will only operate if an auxiliary input is configured as 'Generator Closed Auxiliary' and connected to the auxiliary on the generator contactor or breaker. Once a generator open signal is issued the 'gen open timer' is initiated. Should the 'Generator Closed Auxiliary' input become in-active the timer 'gen open timer' is cancelled. If the timer expires and the 'Generator Closed Auxiliary' has not become in-active the module will issue a 'generator failed to open' alarm.

Breaker Close Pulse Time
This is used to determine the duration of the Generator close signal. This timer is only used if Pulsed outputs are configured to be used.

Breaker Open Pulse Time
This is used to determine the duration of the Generator close signal. This timer is only used if Pulsed outputs are configured to be used.

Transfer Time
This is used to allow for fixed duration transfer breaks when switching from mains to generator and back. It can be used to ensure that the supply is removed from the load for fixed period of time to allow pumps/motors to come to rest etc.

Spring Loading Time
When the unit give open command to the breaker and after that the unit want to give close command the same breaker, this time for between open and close commands, because if there is no delay between open and close commands can be problem the motorized switches.

Retry Number
The unit try to close breaker number of this parameter. If each try there is no close feedback, after last try the alarm will be activated.

LCD DISPLAY (*System->LCD display*)		**Min**	**Max**	**Default**	**Unit**
Language*[6]	Language Selection	ENGLISH/CHINESE		ENGLISH	
Contrast	Digital Contrast	1	9	5	
Auto scroll time	Auto Scroll Time	0 (dis)	250	0	Sec
Auto scroll number*[7]	Auto Scroll Number	1	14	3	
Err. mesg scroll time	Scroll Time For Error Messages	1	250	2	Sec

Language Selection
Language selection: English or Chinese.

Digital Contrast
It is used to change contrast of LCD Display.

Auto Scroll Time
The scroll time between all data display pages.

Auto Scroll Number
The number of data display pages that will be scrolled.

Scroll Time For Error Messages
Error messages are displayed the last line of LCD Display. If more than one error condition is present, each of them is displayed during time defined by Auto Scroll Timer parameter.

COMMUNICATION (*System->Communication*)		**Min**	**Max**	**Default**	**Unit**
Slave address	Slave Address	1	247	1	
Baud rate	Baud Rate 0 - 1200 baud 1 - 2400 baud 2 - 4800 baud 3 - 9600 baud 4 - 19200 baud 5 - 38400 baud	0	5	3	
Parity	Parity 0 - NONE 1 - ODD 2 - EVEN	0	2	0	
Stop bit	Stop Bit (0-> 1 stop bit,1-> 2 stop bit)	0	1	0	

Note: *[6] = Selectable value of this parameter is “ENGLISH/TURKISH” at Trans-MiniAUTO++.XXX (TR) devices.
*[7] = Max. value of this parameter is equal to 20 at Trans-MiniAUTO++.CAN devices
dis = disable

DATE & TIME SET (*System->Date & time set*)		Min	Max	Default	Unit
Year	Year	0	99		
Month	Month	1	12		
Day	Date	1	31		
Week	Day of week	1	7		
Hour	Hour	0	23		
Minute	Minute	0	59		
Second	Second	0	59		

Day of week 1=Monday,2=Tuesday,3=Wednesday,4=Thursday,5=Friday,6=Saturday,7=Sunday

DEFAULT SETTINGS (*System->Default settings*)		Min	Max	Default	Unit
Save setting to def.	Save setting to default	YES / NO		NO	
Reset default sets	Reset default sets	YES / NO		NO	
Reset factory sets	Reset factory sets	YES / NO		NO	

Save setting to default
If this parameter is selected as “Yes”, the unit’s currently parameters save as default sets.
After this parameter is reset automatically to “No”.

Reset default sets
If this parameter is selected as “Yes”, the unit’s parameters back to default sets.
After this parameter is reset automatically to “No”.

Reset factory sets
If this parameter is selected as “Yes”, the unit’s parameters back to factory sets.
After this parameter is reset automatically to “No”.

PASSWORD SETTINGS (*System->Password settings*)		Min	Max	Default	Unit
Operator password	Operator Password	0	9999	0	
Technician password	Technician Password	0	9999	0	

Operator Password
Use this option to change the Operator password. This password allows access to operator parameters section.

Technician Password
Use this option to change the Technician password. It allows access to both operator and technician parameters section.

4.2.2 Generator

GENERATOR VOLT LEVEL (*Generator->Volt level*)		Min	Max	Default	Unit
Under volt shutdown	Generator Under Voltage Shutdown	60(dis)	600	320	V~
Under volt prealarm	Generator Under Voltage Pre-Alarm	60(dis)	600	340	V~
Under volt reset	Generator Under Voltage Pre-Alarm Reset	60	600	350	V~
Over volt shutdown	Generator Over Voltage Shutdown	60	600	440	V~
Over volt prealarm	Generator Over Voltage Pre-Alarm	60(dis)	600	420	V~
Over volt reset	Generator Over Voltage Pre-Alarm Reset	60	600	400	V~
Shutdown delay time	Generator Voltage Shutdown Delay Time	0.0	10.0	1.0	Sec

Note: dis = disable

GENERATOR FREQ LEVEL (*Generator->Frequency level*)		Min	Max	Default	Unit
Nominal frequency	Nominal Alternator Frequency	30.0	75.0	50.0	Hz
Under freq shutdown	Generator Under Frequency Shutdown	30.0(dis)	75.0	43.0	Hz
Under freq prealarm	Generator Under Frequency Pre-Alarm	30.0(dis)	75.0	45.0	Hz
Under freq reset	Generator Under Frequency Pre-Alarm Reset	30.0	75.0	46.0	Hz
Over freq shutdown	Generator Over Frequency Shutdown	30.0(dis)	75.0	58.0	Hz
Over freq prealarm	Generator Over Frequency Pre-Alarm	30.0(dis)	75.0	55.0	Hz
Over freq reset	Generator Over Frequency Pre-Alarm Reset	30.0	75.0	54.0	Hz
Shutdown delay time	Generator Frequency Shutdown Delay Time	0.0	10.0	1.0	Sec

GEN CUR LEVEL & ACT (*Generator->Current level & act.*)		Min	Max	Default	Unit
Under cur. set	Generator Under Current Set	0	9999	1	A~
Under cur. prealarm	Generator Under Current Pre-Alarm	0(dis)	9999	dis	A~
Under cur. reset	Generator Under Current Pre-Alarm Reset	0	9999	5	A~
Under cur. act.	Generator Under Current Actions 0 - Disable 1 - Warning (Alarm Only, No Shutdown) 2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling) 3 - Shutdown (Alarm And Shutdown)	0(dis)	3	dis	
Under act. delay time	Generator Under Current Actions Delay Time	0	99	2	Sec
Over cur. set	Generator Over Current Set	0	9999	9999	A~
Over cur. prealarm	Generator Over Current Pre-Alarm	0(dis)	9999	9990	A~
Over cur. reset	Generator Over Current Pre-Alarm Reset	0	9999	9980	A~
Over cur. act.	Generator Over Current Actions 0 - Disable 1 - Warning (Alarm Only, No Shutdown) 2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling) 3 - Shutdown (Alarm And Shutdown)	0(dis)	3	dis	
Over act. delay time	Generator Over Current Actions Delay Time	0	99	2	Sec
Short circuit cur.	Generator Short Circuit Current Set	0	9999	9999	A~

GEN POWER LEVEL (*Generator->Power level*)		Min	Max	Default	Unit
Under power shutdown	Generator Under Power Shutdown	0(dis)	9999	dis	kVA
Under power prealarm	Generator Under Power Pre-Alarm	0(dis)	9999	dis	kVA
Under power reset	Generator Under Power Pre-Alarm Reset	0	9999	5	kVA
Over power shutdown	Generator Over Power Shutdown	0(dis)	9999	dis	kVA
Over power prealarm	Generator Over Power Pre-Alarm	0(dis)	9999	dis	kVA
Over power reset	Generator Over Power Pre-Alarm Reset	0	9999	0	kVA
Shutdown delay time	Generator Power Shutdown Delay Time	0	99	2	Sec

GENERATOR GENERAL (*Generator->General*)		Min	Max	Default	Unit
Sens.option gen.freq	Sensing Options Generator Frq En/Dis	ENABL/DISBL		ENABL	
Sens.opt.pickup&flywh*[8]	Sensing Opt Pickup En/Dis & Flywheel	0(dis)	1000	DISBL	
All warning are latch	All Warnings Are Latched En/Dis	ENABL/DISBL		DISBL	

Sensing Options Generator Frq En/Dis
ENABLE: Speed sensing will be derived from the generator output frequency.
DISABLE: Speed sensing not will be derived from the generator output frequency.

Sensing Options Pickup En/Dis & Flywheel
DISABLE: Speed sensing will not be derived from the magnetic pickup.
1-1000: Speed sensing will be derived from the magnetic pickup and the number is flywheel teeth on the engine.

All Warnings Are Latched En/Dis
ENABLE: Warnings and pre-alarms will latched when triggered. To reset the alarm either an external reset must be applied to one of the inputs or the 'Reset' pushbutton operated, once the triggering condition has cleared.
DISABLE: Normal operation, the warnings and pre-alarms (except spare inputs, because they have their latching or non-latching selections) will automatically reset once the triggering condition has cleared.

4.2.3 Engine

ENGINE START OPTIONS (*Engine->Starting options*)		Min	Max	Default	Unit
Horn prior start	Audible Alarm Prior To Starting En/Dis	ENABL/DISBL		DISBL	
No. of crank attemp	Number Of Start Attempts	1	10	3	
Cranking time	Cranking Time	1	99	5	Sec
Crank rest time	Crank Rest Time	5	99	10	Sec
Pickup fail delay*[8]	Pickup Sensor Fail Delay(Pickup)	0.1	10.0	1.0	Sec

Audible Alarm Prior To Starting En/Dis
ENABLE: The audible alarm will sound before the engine starts. The sounder will become active once the start delay is initialised, it will remain active until either the engine reaches crank disconnect speed or pre-heat timers are cancelled.

Number Of Start Attempts
This value is the number of times the module will attempt to start the generator. Should the generator start the module will not attempt further starts. If the generator does not start after the final attempt, the module will give a ‘Fail to start’ alarm.

Cranking Time
This is the maximum amount of time that the module will energise the starter motor for during starting attempts once the starter has engaged.

Crank Rest Time
This is the amount of time the module will wait for between start attempts. This is to allow the starter motor to cool and the starter batteries to recover.

Note: *[8] = These parameters are only available at Trans-MiniAUTO++.MPU
dis = disable

ENG. CRANK DISCONNECT (*Engine->Crank disconnect*)		Min	Max	Default	Unit
Generator frequency	Crank Disconnect On Gen. Frequency	25.0	75.0	30.0	Hz
Engine speed	Crank Disconnect On Engine RPM	500	6000	500	RPM
Generator volt	Crank Disconnect On Gen. Voltage	60 (dis)	600	300	V~
Alt. Charge volt	Crank Disconnect On Charge Alt. Voltage	6.0 (dis)	30.0	dis	V⎓
Oil pressure	Crank Disconnect On Oil Pressure	1.0 (dis)	30.0	dis	BAR

The parameters in this page are used for engine started signals. If any of the selected signals appears, the unit assumes that the engine has started.

Crank Disconnect On Gen. Frequency
If the generator frequency over than 30.0 Hz, the unit assumes that the engine has started and the unit stop cranking.

Crank Disconnect On Engine RPM
If the generator speed over than 500 Rpm, the unit assumes that the engine has started and the unit stop cranking.

Crank Disconnect On Gen. Voltage
If the generator voltage over than 300 Vac, the unit assumes that the engine has started and the unit stop cranking.

Crank Disconnect On Charge Alt. Voltage
If the charge alternator voltage over than 6.1 Vdc, the unit assumes that the engine has started and the unit stop cranking. **Note:** If the charge generator input (terminal #13) is disconnect, this parameter selected as disabled (6.0 Vdc).

Crank Disconnect On Oil Pressure
If the oil pressure sender over than this value or the oil pressure digital input (terminal #15) is not switched to -Battery, the unit assumes that the engine has started and the unit stops cranking.

ENGINE SPEED SETS (*Engine->Speed settings*)		Min	Max	Default	Unit
Nominal speed	Nominal Speed	500	5000	1500	RPM
Under speed shutdown	Engine Under Speed Shutdown	500(dis)	5000	dis	RPM
Under speed prealarm	Engine Under Speed Prealarm	500(dis)	5000	dis	RPM
Under speed reset	Engine Under Speed Prealarm Reset	500	5000	500	RPM
Over speed shutdown	Engine Over Speed Shutdown	500(dis)	5000	dis	RPM
Over speed prealarm	Engine Over Speed Prealarm	500(dis)	5000	dis	RPM
Over speed reset	Engine Over Speed Prealarm Reset	500	5000	500	RPM
Shutdown delay time	Engine Speed Shutdown Delay Time	0.0	10.0	1.0	Sec

The parameters in this page are used for the generator speed low and high alarms.

ENGINE PLANT BATTERY (*Engine->Plant battery*)		Min	Max	Default	Unit
Under volt	Battery Undervolts Warning	6.0(dis)	30.0	10.0	V⎓
Under volt reset	Battery Undervolts Warning Reset	6.0	30.0	10.5	V⎓
Under volt delay	Battery Undervolts Volts Delay	0.0	9.9	1.0	Sec
Over volt	Battery Overvolts Warning	6.0(dis)	30.0	30.0	V⎓
Over volt reset	Battery Overvolts Warning Reset	6.0	30.0	29.5	V⎓
Over volt delay	Battery Overvolts Delay	0.0	9.9	1.0	Sec
Alt. chg. warning	Charge Alternator Warning	6.0(dis)	30.0	dis	V⎓

The parameters in this page are used for the battery voltage low and high alarms and the charge alternator voltage warning.

CANBUS ECU (*Engine->CanBus ECU*)*9		Min	Max	Default	Unit
Baud rate	Baud Rate: 0 - 20 1 - 50 2 - 100 3 - 125 4 - 250 5 - 500 6 - 800 7 - 1.000	0	7	4	kBaud
J1939 ECU type	J1939 ECU Type Selection: 0 - Disable 1 - Standard 2 - Volvo EMS2 3 - Volvo EDC4 4 - Perkins	0(dis)	4	0	
Device address	Device Address	0	255	17	
Engine cont. address	Engine Control Address	0	255	0	
ECU remote control	ECU Remote Control via J1939	ENABL/DISBL		DISBL	
Speed control enable	Speed Control via J1939	ENABL/DISBL		DISBL	
Oil pres cont. enab	Oil Pressure Control via J1939	ENABL/DISBL		DISBL	
Temp. control enable	Coolant Temperature Control via J1939	ENABL/DISBL		DISBL	
Speed set point	Speed Set Point Selection	1500 / 1800		1500	RPM
Speed correction	Speed Correction Value	0	100	50	%

Baud Rate
It defines the used Baud rate.
Note: All participants on the CAN bus must use the same Baud rate.

J1939 ECU Type Selection
The J1939 interface of this unit can be operated with different ECUs. This parameter determines the operating mode of the used ECUs.
Note-1: If a Deutz EMR2 or a Deutz EMR3 is utilized, all settings are to be configured as described for the Volvo EDC4 in this manual. And if a Volvo EDC3 or a Volvo EMS1 is utilized, all settings are to be configured as described for the Volvo EMS2 in this manual.
Note-2: If this parameter is selected as “disable”, No messages will be sent or received.

ECU Device Address
The unit sends J1939 request and control messages with this ID. It must be changed for different ECU types according to the following table. The ECU listens only to control messages, if they are sent to the correct address.

Volvo EMS2	*Volvo EDC4*	*Perkins*
17	3	43

Note: Changing above mentioned parameter becomes only effective after restarting the unit.

Engine Control Address
This parameter configures the address of the J1939 ECU, which is controlled.

Note: *9 = Parameters in this table are only available at Trans-MiniAUTO++.CAN
dis = disable

ECU Remote Control Via J1939
If this parameter is selected as “Enable”, The unit sends remote control messages to the ECU if the selected ECU type is supporting the J1939 Remote control Messages. Available messages are engine start-stop, 50/60 Hz selection or Idle mode. For some ECUs;

Parameter	Volvo EMS2	Volvo EDC4	Perkins	Standard
Remote Start	Yes	No	No	No
Remote Stop	Yes	No	No	No
50/60 Hz Selection	Yes	No	No	No
Idle Mode	Yes	No	No	No

If this parameter is selected as “Disable”, The ECU remote control via the J1939 protocol will be disabled.

Speed Control via J1939
If this parameter is selected as “Enable”, The speed sensing from J1939 ECU will be used for the speed (Rpm) failures.

Oil Pressure Control via J1939
If this parameter is selected as “Enable”, The oil pressure sensing from J1939 ECU will be used for the oil pressure failures and the engine started signal.

Coolant Temperature Control via J1939
If this parameter is selected as “Enable”, The coolant temperature sensing from J1939 ECU will be used for the coolant temperature failures.

Speed Set Point Selection (50/60 Hz)
This parameter used for to select the requested engine speed as 1500Rpm (50Hz) or 1800Rpm (60Hz). **Note:** The scenario; first change the parameter, next wait at least 5 seconds, and then start the engine.

Speed Correction Value
This parameter can be changed between 0 and 100%. The engine should change the speed as follows:

0% = rated speed – speed deviation ECU e.g. 1500 – 120 = 1380rpm
50% = rated speed e.g. = 1500rpm
100% = rated speed + speed deviation ECU e.g. 1500 + 120 = 1620rpm

CANBUS ERROR SET (*Engine->CanBus error set*)*10		Min	Max	Default	Unit
CAN fault actions	Can Fault Actions: 0- Disable 1- Warning Non-Latching 2- Warning (Alarm Only, No Shutdown) 3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling) 4- Shutdown (Alarm And Shutdown)	0(dis)	4	0	
CAN fault activation	Can Fault Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	0	
CAN fault delay	Can Fault Delay	2	250	10	Sec
Amber warn.actions	J1939 Amber Warning Lamp Actions: 0- Disable 1- Warning Non-Latching 2- Warning (Alarm Only, No Shutdown) 3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling) 4- Shutdown (Alarm And Shutdown)	0(dis)	4	0	
Amber warn.activation	J1939 Amber Warning Lamp Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
Amber warn.delay	J1939 Amber Warning Lamp Delay	0	250	2	Sec
Red stop actions	J1939 Red Stop Lamp Actions: 0- Disable 1- Warning Non-Latching 2- Warning (Alarm Only, No Shutdown) 3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling) 4- Shutdown (Alarm And Shutdown)	0(dis)	4	0	
Red stop activation	J1939 Red Stop Lamp Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
Red stop delay	J1939 Red Stop Lamp Delay	0	250	2	Sec

Note: *10 = Parameters in this table are only available at Trans-MiniAUTO++.CAN
dis = disable

ENGINE MAINTENANCE (*Engine->Maintenance*)		Min	Max	Default	Unit
Running hour interval	Running Hours Interval	0(dis)	9999	5000	Hour
Maint.date interval	Maintenance Date Interval	0(dis)	12	6	Month
Eng. stop when maint	Force Engine Shutdown When Maintenance Is Due	ENABL/DISBL		DISBL	
Eng.running hour(lsb)	Engine Running Hour (Lsb)	0	255	0	
Eng.running hour	Engine Running Hour	0	255	0	
Eng.running hour(msb)	Engine Running Hour(Msb)	0	14	0	
Maintenance okay	Maintenance Okay	YES/NO		NO	

The user can change the engine running hours value by using these parameters (Engine Running Hour (Lsb) , Engine Running Hour and Engine Running Hour (Msb)).

For example; if the engine running hours was changed 75112 hours, the values of these parameters was calculated as follows;

Engine Running Hour (Msb) = 75112 / 65536
= **1**

Intermediate Value = 75112 – (Engine Running Hour (Msb) * 65536)
= 75112 – (1 * 65536)
= 9576.

Engine Running Hour = Intermediate Value / 256
= 9576 / 256
= **37**

Engine Running Hour (Lsb) = Intermediate Value – (Engine Running Hour * 256)
= 9576 – (37 * 256)
= **104**

LOAD TEST (*Engine->Load test*)		Min	Max	Default	Unit
Disable/enable select	Disable, No Load or On Load Selection	0-DISABLE 1-NO LOAD 2-ON LOAD		0-DISABLE	

Disable, No Load or On Load Selection
DISABLE: Test mode disable.
NO LOAD: The generator will be running without taking the load in test mode.
ON LOAD: The generator will be running with load in test mode.

Note: dis = disable

ENGINE GENERAL (*Engine->General*)		Min	Max	Default	Unit
Fuel selection	Engine Fuel Selection	0-GAS 1-DIESEL 2-GASOLINE		1-DIESEL	
Stop solenoid time	Stop Solenoid Time	5	99	20	Sec
Ignition delay	Ignition Delay	1	99	5	Sec
Gas valve delay	Gas Valve Delay	1	99	5	Sec
Min. of ignition speed	Minimum Ignition Speed	10	1500	200	RPM
Choke time	Choke Time	0.0	30.0	0.8	Sec

Engine Fuel (Gas/ Diesel/Gasoline) Selection
Gas, Diesel or Gasoline engines can be selected.

Stop Solenoid Time
This timer is used if the unit is configured to operate an Energise to stop engine. It dictates the duration that the Stop Solenoid output will remain active after the module has detected the engine has come to rest. If the Stop Solenoid output is not configured, this timer will still operate, preventing an immediate restart.

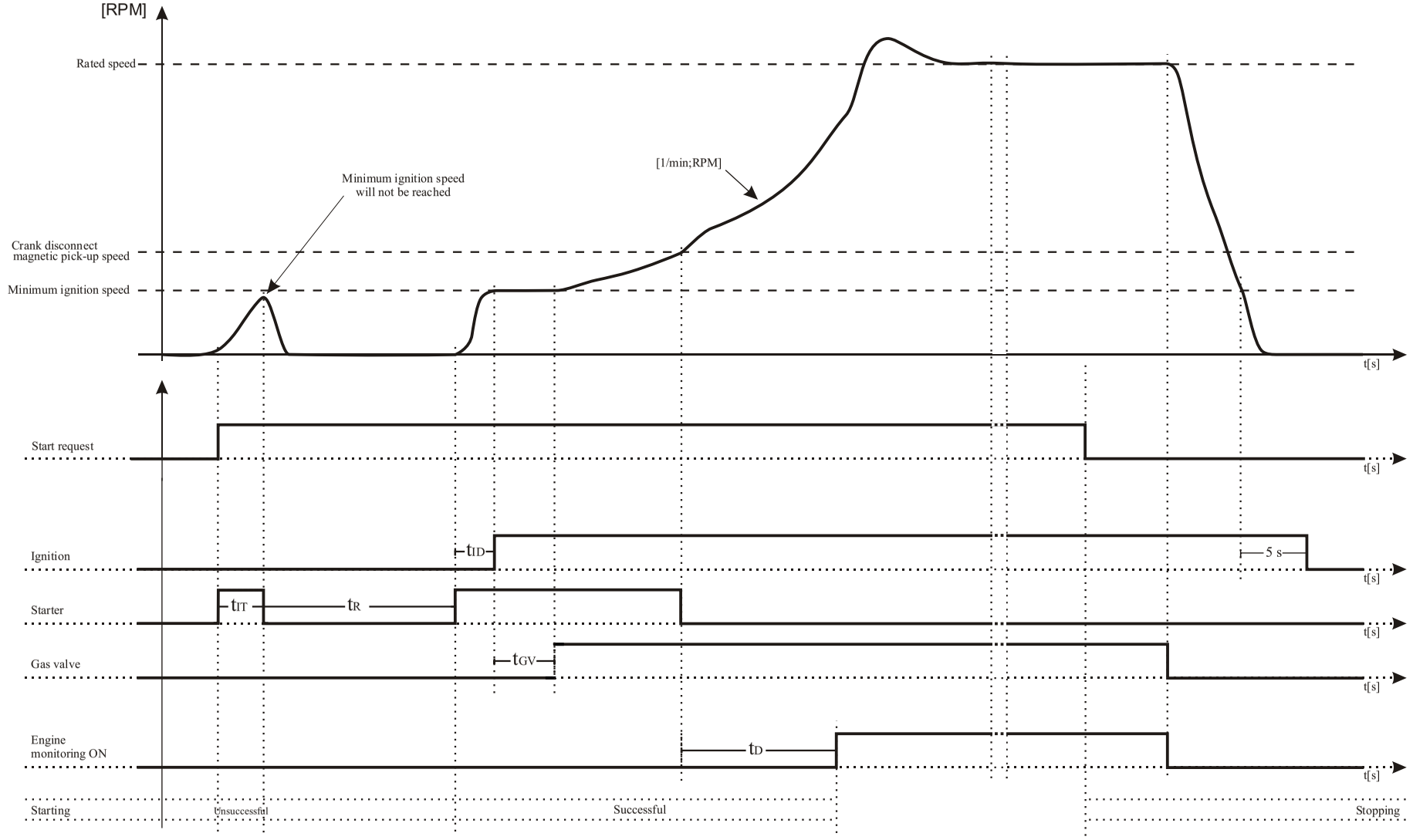
Ignition Delay
With gas engines often a purging operation is desired before starting. With the engaging of the starter the ignition delay is started. If the 'min ignition speed' is reached after expiry of this time, the configurable relay output 'ignition' is set.

Gas Valve Delay
By setting the ignition relay the gas valve delay is started. After the expiry of the set time as long as the number of revolutions is higher than the minimum ignition speed, the gas valve is set. When the necessary engine shutdown process, gas valve is de-energised.

Minimum Ignition Speed
After expiry of the ignition delay the number of revolutions set must be reached, so that the configurable relay output 'ignition' will be set.

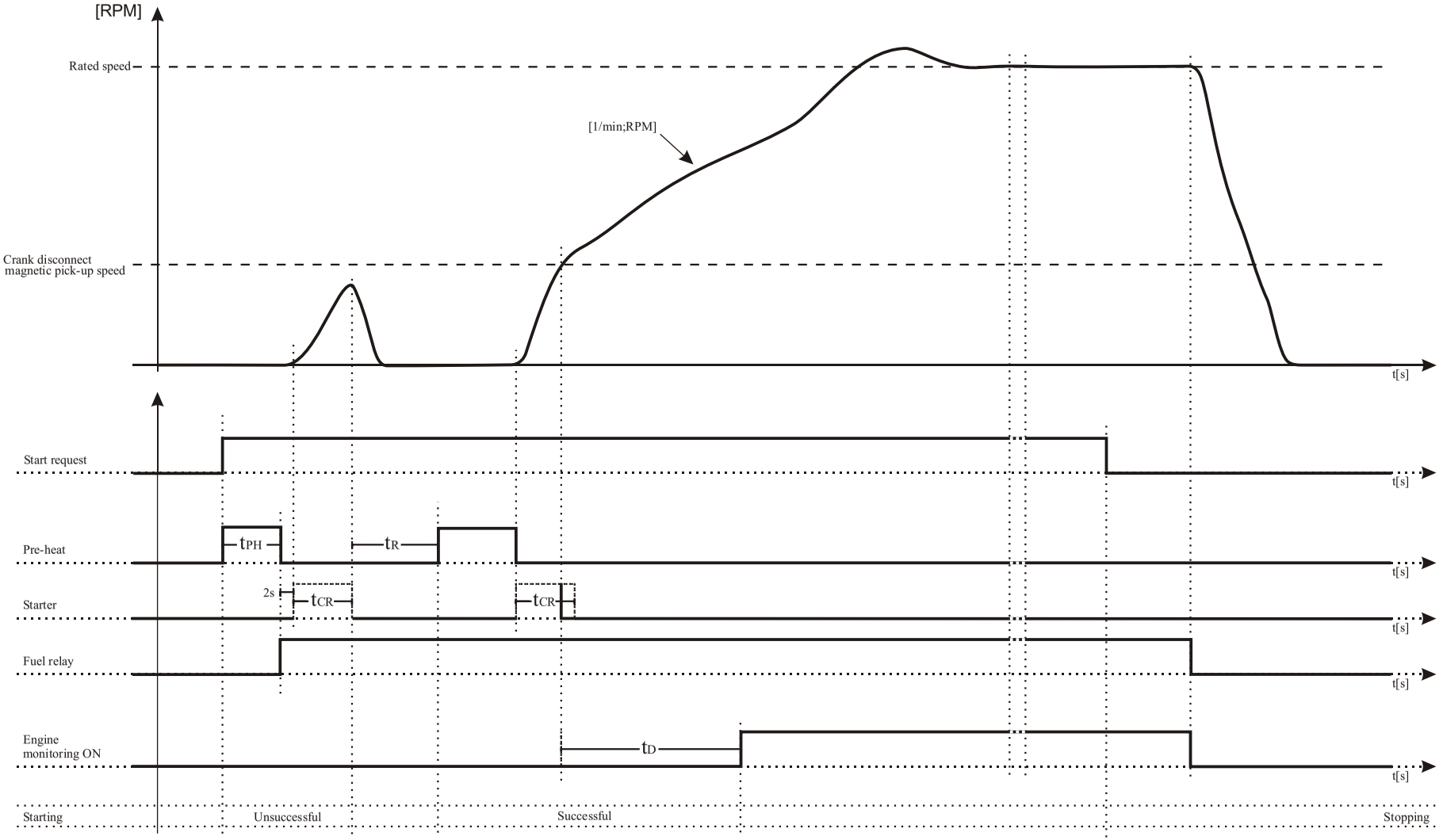
Choke Time
This timer dictates that how long choke output will be active in gasoline engines.

t_R	Interval between 2 start attempts	[s]
t_{ID}	Ignition delay	[s]
t_{GV}	Gas valve delay	[s]
t_D	Engine delayed monitoring	[s]



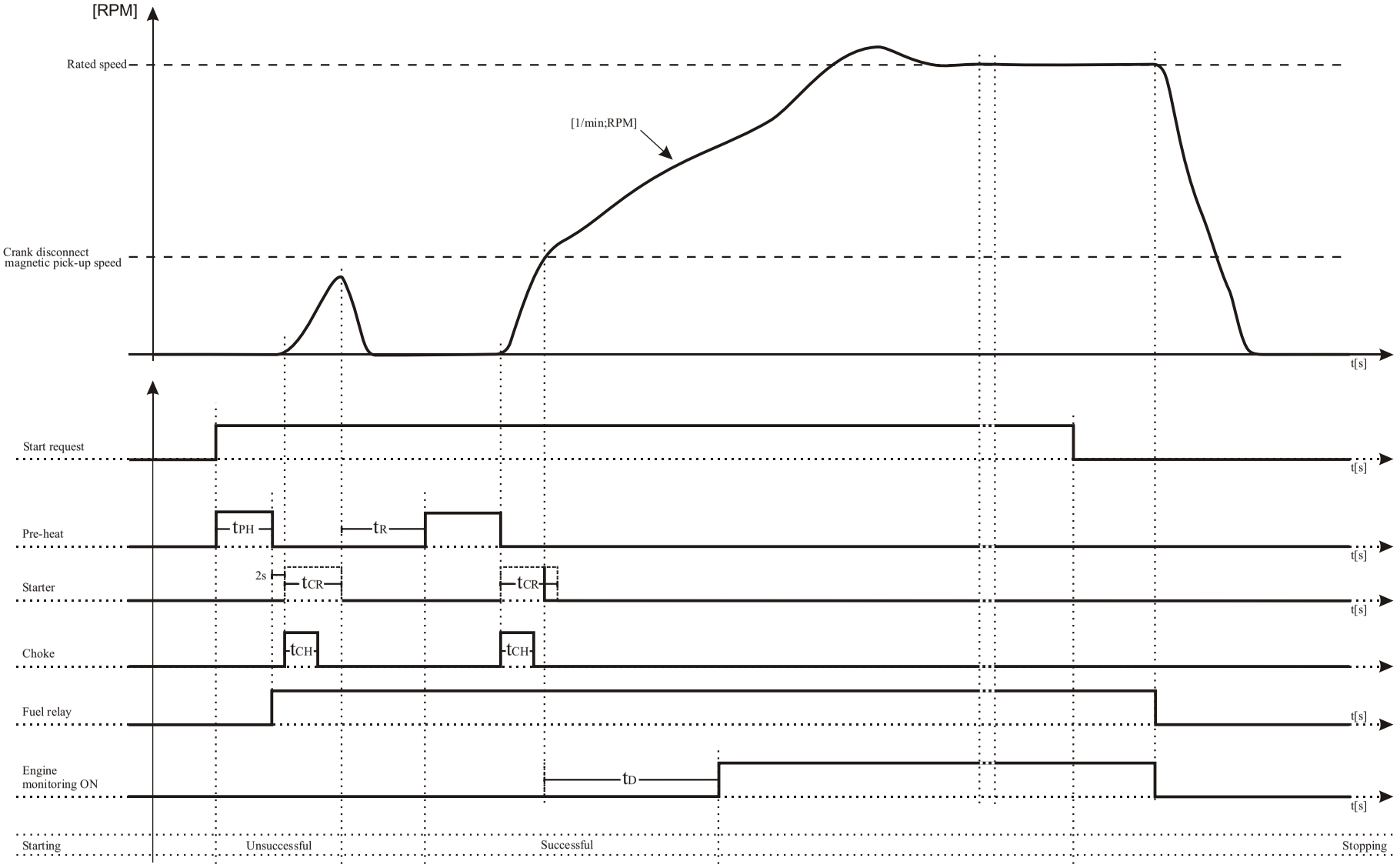
Start/Stop Diagram for GAS ENGINE

t_{PH}	Preheating time	[s]
t_{CR}	Engagement time	[s]
t_R	Interval between 2 start attempts	[s]
t_D	Engine delayed monitoring	[s]



Start/Stop Diagram for DIESEL ENGINE

t_{PH}	Preheating time	[s]
t_{CR}	Engagement time	[s]
t_R	Interval between 2 start attempts	[s]
t_D	Engine delayed monitoring	[s]
t_{CH}	Choke time	[s]



Start/Stop Diagram for GASOLINE ENGINE

4.2.4 Inputs

SENDER INPUTS (*Inputs->Sender inputs*)		Min	Max	Default	Unit
Oil pressure unit	Oil Pressure Unit	BAR/PSI/KPA		BAR	
Oil press. input type	Oil Pressure Input Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO 5 BAR 4 - VDO 7 BAR 5 - VDO 10 BAR 6 - DATCON 5 BAR 7 - DATCON 7 BAR 8 - MURPHY 7 BAR 9 - User Configured		3	
Oil pressure prealarm	Oil Pressure Pre-Alarm	0.0 (dis)	30.0	1.2	BAR
Oil pressure reset	Oil Pressure Pre-Alarm Reset	0.0	30.0	1.4	BAR
Oil pressure shutdown	Oil Pressure Shutdown	0.0	30.0	1.0	BAR
Temperature unit	Coolant Temperature Unit	ºC/ºF		ºC	
Temp. input type	Coolant Temperature Input Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO 120 ºC 4 - VDO 150 ºC 5 - DATCON 6 - MURPHY 7 - PT100 8 - User Configured		3	
High temp. prealarm	High Temperature Pre-Alarm	0 (dis)	300	90	ºC
High temp. reset	High Temp. Pre-Alarm Reset	0	300	88	ºC
High temp. shutdown	High Temperature Shutdown	0	300	95	ºC
Low temp. warning	Low Temperature Warning	0 (dis)	70	0 (dis)	ºC
Conf. AI unit	Configurable Analog Input Unit	BAR/PSI/KPA/ºC/ºF/%/Lt		%	
Conf. AI type	Configurable Analog Input Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO OHM (10-180) 4 - VDO TUBE (90-0) 5 - US OHM (240-33) 6 - GM OHM (0-90) 7 - FORD (73-10) 8 - User Configured		0 (dis)	
Conf. AI low prealrm	Configurable Analog Input Low Pre-Alarm	0 (dis)	3000	0 (dis)	%
Conf. AI low reset	Configurable Analog Input Low Reset	0	3000	60	%
Conf. AI low shutdwn	Configurable Analog Input Low Shutdown	0 (dis)	3000	0 (dis)	%
Conf. AI high prealr	Configurable Analog Input High Pre-Alarm	0 (dis)	3000	0 (dis)	%
Conf. AI high reset	Configurable Analog Input High Reset	0	3000	90	%
Conf. AI high shutd.	Configurable Analog Input High Shutdown	0 (dis)	3000	0 (dis)	%
Conf. AI control ON	Configurable Analog Input control ON	0 (dis)	3000	0 (dis)	%
Conf. AI control OFF	Configurable Analog Input control OFF	0	3000	75	%

Oil Pressure Input Type
This section is used to configure the Oil Pressure sender input.
0-NOT USED: The Oil Pressure input will not be monitored.
1-DIGITAL NC: The Oil pressure input is fed from an engine mounted digital pressure switch. This switch returns a closed signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will open.
2-DIGITAL NO: The Oil pressure input is fed from an engine mounted digital pressure switch. This switch returns an open signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will close.
3, 4, 5, 6, 7, 8 and 9: Oil pressure input is connected to a resistive type engine mounted oil pressure transducer. If this parameter selected as "9**-USER CONFIGURED"**, the user can input the data manually according to the sensor curve.

Temperature Input Type
This section is used to configure the Coolant Temperature sender input.
0-NOT USED: The Coolant Temperature input will not be monitored.
1-DIGITAL NC: The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns a closed signal during low temperature, should the temperature rise above the switch manifacturers trip point the switch contact will open.
2-DIGITAL NO: The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns an open signal during low temperature, should the temperature rise above the switch manifacturers trip point the switch contact will close.
3, 4, 5, 6, 7 and 8: The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. If this parameter selected as "**8-USER CONFIGURED"**, the user can input the data manually according to the sensor curve.

Configurable Analog Input Type
This section is used to configure the Configurable Analog Input sender input.
0-NOT USED: The Configurable Analog Input will not be monitored.
1-DIGITAL NC: open for low Configurable Analog Input.
2-DIGITAL NO: close for low Configurable Analog Input.
3, 4, 5, 6, 7 and 8: The Configurable Analog Input input is connected to a resistive type engine mounted level/temperature/pressure transducer. If this parameter selected as "**8-USER CONFIGURED"**, the user can input the data manually according to the sensor curve.

SENDER LINEARISATION (*Inputs->Sender linearisation*)		Min	Max	Default	Unit
Oil pressure sender 1	Oil Pressure Sender Point-1	0	1300	11	R
Oil pressure 1	Oil Pressure Point-1	0.0	30.0	0.0	BAR
Oil pressure sender 2	Oil Pressure Sender Point-2	0	1300	29	R
Oil pressure 2	Oil Pressure Point-2	0.0	30.0	0.5	BAR
Oil pressure sender 3	Oil Pressure Sender Point-3	0	1300	47	R
Oil pressure 3	Oil Pressure Point-3	0.0	30.0	1.0	BAR
Oil pressure sender 4	Oil Pressure Sender Point-4	0	1300	65	R
Oil pressure 4	Oil Pressure Point-4	0.0	30.0	1.5	BAR
Oil pressure sender 5	Oil Pressure Sender Point-5	0	1300	82	R
Oil pressure 5	Oil Pressure Point-5	0.0	30.0	2.0	BAR
Oil pressure sender 6	Oil Pressure Sender Point-6	0	1300	100	R
Oil pressure 6	Oil Pressure Point-6	0.0	30.0	2.5	BAR
Oil pressure sender 7	Oil Pressure Sender Point-7	0	1300	117	R
Oil pressure 7	Oil Pressure Point-7	0.0	30.0	3.0	BAR
Oil pressure sender 8	Oil Pressure Sender Point-8	0	1300	134	R
Oil pressure 8	Oil Pressure Point-8	0.0	30.0	3.5	BAR
Oil pressure sender 9	Oil Pressure Sender Point-9	0	1300	151	R
Oil pressure 9	Oil Pressure Point-9	0.0	30.0	4.0	BAR
Oil pressure sender 10	Oil Pressure Sender Point-10	0	1300	184	R
Oil pressure 10	Oil Pressure Point-10	0.0	30.0	5.0	BAR
Temperature sender 1	Temperature Sender Point-1	0	1300	291	R
Temperature 1	Temperature Point-1	0	300	40	ºC
Temperature sender 2	Temperature Sender Point-2	0	1300	197	R
Temperature 2	Temperature Point-2	0	300	50	ºC
Temperature sender 3	Temperature Sender Point-3	0	1300	134	R
Temperature 3	Temperature Point-3	0	300	60	ºC
Temperature sender 4	Temperature Sender Point-4	0	1300	97	R
Temperature 4	Temperature Point-4	0	300	70	ºC
Temperature sender 5	Temperature Sender Point-5	0	1300	70	R
Temperature 5	Temperature Point-5	0	300	80	ºC
Temperature sender 6	Temperature Sender Point-6	0	1300	51	R
Temperature 6	Temperature Point-6	0	300	90	ºC
Temperature sender 7	Temperature Sender Point-7	0	1300	38	R
Temperature 7	Temperature Point-7	0	300	100	ºC
Temperature sender 8	Temperature Sender Point-8	0	1300	29	R
Temperature 8	Temperature Point-8	0	300	110	ºC
Temperature sender 9	Temperature Sender Point-9	0	1300	22	R
Temperature 9	Temperature Point-9	0	300	120	ºC
Temperature sender 10	Temperature Sender Point-10	0	1300	15	R
Temperature 10	Temperature Point-10	0	300	140	ºC
Conf. AI sender 1	Configurable Analog Input Sender Point-1	0	1300	10	R
Conf. AI value 1	Configurable Analog Input Point-1	0	3000	0	%
Conf. AI sender 2	Configurable Analog Input Sender Point-2	0	1300	30	R
Conf. AI value 2	Configurable Analog Input Point-2	0	3000	11	%
Conf. AI sender 3	Configurable Analog Input Sender Point-3	0	1300	50	R
Conf. AI value 3	Configurable Analog Input Point-3	0	3000	22	%
Conf. AI sender 4	Configurable Analog Input Sender Point-4	0	1300	70	R
Conf. AI value 4	Configurable Analog Input Point-4	0	3000	33	%
Conf. AI sender 5	Configurable Analog Input Sender Point-5	0	1300	90	R
Conf. AI value 5	Configurable Analog Input Point-5	0	3000	44	%

Conf. AI sender 6	Configurable Analog Input Sender Point-6	0	1300	110	R
Conf. AI value 6	Configurable Analog Input Point-6	0	3000	55	%
Conf. AI sender 7	Configurable Analog Input Sender Point-7	0	1300	130	R
Conf. AI value 7	Configurable Analog Input Point-7	0	3000	66	%
Conf. AI sender 8	Configurable Analog Input Sender Point-8	0	1300	150	R
Conf. AI value 8	Configurable Analog Input Point-8	0	3000	77	%
Conf. AI sender 9	Configurable Analog Input Sender Point-9	0	1300	170	R
Conf. AI value 9	Configurable Analog Input Point-9	0	3000	88	%
Conf. AI sender 10	Configurable Analog Input Sender Point-10	0	1300	190	R
Conf. AI value 10	Configurable Analog Input Point-10	0	3000	100	%

CONF. INPUT-1 (*Inputs->Conf. input-1*)		Min	Max	Default	Unit
Dis,user conf.or list	0- Disable 1- User Configured 2- Select From List	0(dis)	2	2	
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	1	
Indication	If User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
Activation	If User Configured 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
Select from list	If Select From List 0-Remote Start On Load 1-Remote Start Off Load 2-Reserved 3-Reserved 4-Reserved 5-Reserved 6-Simulate Auto Button 7-Simulate Test Button 8-Reserved 9-Simulate Start Button 10-Simulate Stop Button 11-Generator Closed Auxiliary 12-Generator Load Inhibit 13-Reserved 14-Reserved 15-Auto Restore Inhibit 16-Auto Start Inhibit 17-Panel Lock 18-Reserved 19-Reserved 20-Reserved 21-Reserved 22-Remote Inhibit 23-Being Found Alive 24-Reserved 25-Low Oil Pressure 26-High Temperature 27-Emergency Stop 28-Low Oil Level	0	28	27	
Active delay	Input active delay	0	250	0	Sec

Note: dis = disable

CONF. INPUT-2 (*Inputs->Conf. input-2*)		Min	Max	Default	Unit
Dis,user conf.or list	0- Disable 1- User Configured 2- Select From List	0(dis)	2	2	
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Indication	If User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
Activation	If User Configured 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
Select from list	If Select From List 0-Remote Start On Load 1-Remote Start Off Load 2-Reserved 3-Reserved 4-Reserved 5-Reserved 6-Simulate Auto Button 7-Simulate Test Button 8-Reserved 9-Simulate Start Button 10-Simulate Stop Button 11-Generator Closed Auxiliary 12-Generator Load Inhibit 13-Reserved 14-Reserved 15-Auto Restore Inhibit 16-Auto Start Inhibit 17-Panel Lock 18-Reserved 19-Reserved 20-Reserved 21-Reserved 22-Remote Inhibit 23-Being Found Alive 24-Reserved 25-Low Oil Pressure 26-High Temperature 27-Emergency Stop 28-Low Oil Level	0	28	0	
Active delay	Input active delay	0	250	0	Sec

Note: dis = disable

CONF. INPUT-3 (*Inputs->Conf. input-3*)		Min	Max	Default	Unit
Dis,user conf.or list	0- Disable 1- User Configured 2- Select From List	0(dis)	2	0	
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Indication	If User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
Activation	If User Configured 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
Select from list	If Select From List 0-Remote Start On Load 1-Remote Start Off Load 2-Reserved 3-Reserved 4-Reserved 5-Reserved 6-Simulate Auto Button 7-Simulate Test Button 8-Reserved 9-Simulate Start Button 10-Simulate Stop Button 11-Generator Closed Auxiliary 12-Generator Load Inhibit 13-Reserved 14-Reserved 15-Auto Restore Inhibit 16-Auto Start Inhibit 17-Panel Lock 18-Reserved 19-Reserved 20-Reserved 21-Reserved 22-Remote Inhibit 23-Being Found Alive 24-Reserved 25-Low Oil Pressure 26-High Temperature 27-Emergency Stop 28-Low Oil Level	0	28	4	
Active delay	Input active delay	0	250	5	Sec

Note: dis = disable

CONFIGURABLE INPUTS SELECTIONS

0 REMOTE START ON LOAD
In AUTO mode, if one of the configurable inputs are selected as 0 (Remote Start On Load) and this input is active, then the unit will perform the start sequence and transfer load to the generator. If the input is passive, the unit will perform the stop sequence.

1 REMOTE START OFF LOAD
If this input is active, operation will be similar to the 'Remote Start On Load' function except that the generator will not be instructed to take the load. This function can be used where an engine only run is required e.g. for exercise.

2 RESERVED

3 RESERVED

4 RESERVED

5 RESERVED

6 SIMULATE AUTO BUTTON
This input mimic's the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.

7 SIMULATE TEST BUTTON
This input mimic's the operation of the 'Test' button and is used to provide a remotely located Test mode push button.

8 RESERVED

9 SIMULATE START BUTTON
This input mimic's the operation of the 'Start' button and is used to provide a remotely located start push button.

10 SIMULATE STOP BUTTON
This input mimic's the operation of the 'Stop' button and is used to provide a remotely located Stop push button.

11 GENERATOR CLOSED AUXILIARY
This input is used to provide feedback to allow the unit to give true indication of the contactor or circuit breaker switching status. It should be connected to the generator load switching device auxiliary contact.

12 GENERATOR LOAD INHIBIT
This input is used to prevent the unit from loading the generator. If the generator is already on load, activating this input will cause the unit to unload the generator. Removing the input will allow the generator to be loaded again. **Note:** This input only operates to control the generator-switching device if the unit load switching logic is attempting load the generator.

13 RESERVED

14 RESERVED

15 AUTO RESTORE INHIBIT
When module in the AUTO mode. In the event of a remote start, the generator will be instructed to start and take load. On removal of the remote start signal, the module will continue to run the generator on load until this AUTO RESTORE INHIBIT input is removed. Once the input is removed the unit will take off the load and supply and follow a normal generator stop sequence.

16 AUTO START INHIBIT
This input is used to provide an over-ride function to prevent the unit from starting the generator in the event of a remote start occurring. If this input is active and a remote start signal occurs the unit will not give a start command to the generator. If this input signal is then removed, the unit will operate as if a remote start has occurred, starting and loading the generator. If the 'Auto Start Inhibit' signal become active once more it will be ignored until the unit shutdown the generator.

17 PANEL LOCK
This input is used to provide security to the installation. If the panel lock input is active, the unit will not respond to operation of the mode select or start buttons. This allows the unit to be placed into a spesific mode (such as Auto) and than secured. The operation of the unit is not affected and the operator will still be able to view the various instrumentation pages etc. **Note:** External control sources (i.e. Simulate Start Button) are not affected by the panel lock input and will continue to operate normally.

18 RESERVED

19 RESERVED

20 RESERVED

21 RESERVED

22 REMOTE INHIBIT
In AUTO mode, if one of the configurable inputs are selected as 22 (Remote Inhibit) and this input is active, the module will inhibit the generator for starting. In the other hand, if this input is active while the generator was starting, the module will stop the generator.

23 BEING FOUND ALIVE
When this input is active, controlling the engine remotely is not possible.

24 RESERVED

25 LOW OIL PRESSURE
This input is used as the oil pressure failure input.

26 HIGH TEMPERATURE
This input is used as the temperature failure input.

27 EMERGENCY STOP
This input is used as the emergency stop input.

28-LOW OIL LEVEL
This input is used as the oil level failure input. It won’t be checked while starting or stopping attemps.

4.2.5 Outputs

CONF. OUTPUT-1 (*Outputs->Conf. output-1*)		Min	Max	Default	Unit
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Function	0-NOT USED 1-AIR FLAP CONTROL 2-ALARM RESET 3-AUDIBLE ALARM 4-AUTO START INHIBIT 5-RESERVED 6-BATTERY HIGH VOLTAGE 7-BATTERY LOW VOLTAGE 8-RESERVED 9-CAN ECU POWER (only available at Trans-MiniAUTO++.CAN) 10-CAN ECU STOP (only available at Trans-MiniAUTO++.CAN) 11-CHARGE ALTERNATOR FAILURE 12-COMMON ALARM 13-COMMON ELECTRICAL TRIP ALARM 14-COMMON SHUTDOWN ALARM 15-COMMON WARNING ALARM 16-COOLING FAN AFTER START 17-COOLING FAN AFTER STOP 18-COOLANT TEMPERATURE HIGH PRE-ALARM 19-COOLANT TEMPERATURE HIGH SHUTDOWN 20-COOLING DOWN TIMER IN PROGRESS 21-CRANK RELAY ENERGISED 22-DELAYED ALARMS ACTIVE 23-DIGITAL INPUT1 ALARM 24-DIGITAL INPUT2 ALARM 25-DIGITAL INPUT3 ALARM 26-RESERVED 27-RESERVED 28-RESERVED 29-RESERVED 30-RESERVED 31-RESERVED 32-RESERVED 33-RESERVED 34-RESERVED 35-RESERVED 36-RESERVED 37-RESERVED 38-RESERVED 39-EMERGENCY STOP 40-FAIL TO START ALARM 41-FAIL TO STOP ALARM 42-CONFIGURABLE ANALOG INPUT CONTROL 43-FUEL RELAY ENERGISED 44-GAS ENGINE IGNITION OUTPUT 45-GENERATOR AT REST 46-GENERATOR AVAILABLE 47-GENERATOR CLOSED AUXILIARY 48-GENERATOR FAILED TO CLOSE 49-GENERATOR FAILED TO OPEN 50-GENERATOR HIGH FREQUENCY PRE-ALARM 51-GENERATOR HIGH FREQUENCY SHUTDOWN 52-GENERATOR HIGH VOLTAGE PRE-ALARM 53-GENERATOR HIGH VOLTAGE SHUTDOWN 54-GENERATOR LOAD INHIBIT 55-GENERATOR LOW FREQUENCY PRE-ALARM 56-GENERATOR LOW FREQUENCY SHUTDOWN 57-GENERATOR LOW VOLTAGE PRE-ALARM 58-GENERATOR LOW VOLTAGE SHUTDOWN 59-GENERATOR STOPPING 60-GENERATOR OPEN BREAKER 61-HORN OUTPUT LATCHED 62-HORN OUTPUT PULSED 63-LAMP TEST 64-RESERVED 65-LOSS OF MAGNETIC PICK-UP SPEED SIGNAL (only available at Trans-MiniAUTO++.MPU) 66-LOW TEMPERATURE 67-MAINTENANCE DUE ALARM 68-RESERVED 69-RESERVED 70-RESERVED 71-RESERVED 72-RESERVED 73-RESERVED 74-RESERVED 75-RESERVED 76-RESERVED 77-RESERVED 78-NO LOADING COMMAND 79-OIL PRESSURE LOW PRE-ALARM 80-OIL PRESSURE LOW SHUTDOWN 81-CONFIGURABLE ANALOG INPUT HIGH PREALARM 82-CONFIGURABLE ANALOG INPUT HIGH SHUTDOWN 83-OVER CURRENT PRE-ALARM 84-OVER CURRENT 85-OVER POWER PRE-ALARM 86-OVER POWER SHUTDOWN 87-OVERSPEED PRE-ALARM 88-OVERSPEED SHUTDOWN 89-PANEL LOCK 90-PRE-HEAT(during preheat timer) 91-PRE-HEAT(until end of cranking) 92-PRE-HEAT(until end of warming) 93-PRE-HEAT(until end safety on) 94-REMOTE START PRESENT 95-REMOTE STOP DELAY IN PROGRESS 96-SHORT CIRCUIT 97-SMOKE LIMITING 98-STARTING ALARM 99-STARTING ALARMS ARMED 100-STOP RELAY ENERGISED 101-SYSTEM IN AUTO MODE 102-SYSTEM IN MANUAL MODE 103-SYSTEM IN STOP MODE 104-SYSTEM IN TEST MODE 105-UNDER CURRENT PRE-ALARM 106-UNDER CURRENT 107-UNDER POWER PRE-ALARM 108-UNDER POWER SHUTDOWN 109-UNDERSPEED PRE-ALARM 110-UNDERSPEED SHUTDOWN 111-WAITING FOR GENERATOR 112-RESERVED 113-LOAD SUPPLY FROM GENERATOR 114-RESERVED 115-CONFIGURABLE ANALOG INPUT LOW PRE-ALARM 116-CONFIGURABLE ANALOG INPUT LOW SHUTDOWN 117-RESERVED 118-RESERVED 119-RESERVED 120-RESERVED 121-CHOKE ACTIVE 122-REMOTE CONTROL ACTIVE	0	122	43	

CONF. OUTPUT-2 (*Outputs->Conf. output-2*)		Min	Max	Default	Unit
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Function	The same as Configurable Output-1 options	0	122	21	

CONF. OUTPUT-3 (*Outputs->Conf. output-3*)		Min	Max	Default	Unit
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Function	The same as Configurable Output-1 options	0	122	62	

CONF. OUTPUT-4 (*Outputs->Conf. output-4*)		Min	Max	Default	Unit
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Function	The same as Configurable Output-1 options	0	122	68	

CONF. OUTPUT-5 (*Outputs->Conf. output-5*)		Min	Max	Default	Unit
Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
Function	The same as Configurable Output-1 options	0	122	12	

CONFIGURABLE OUTPUTS SELECTIONS

0 NOT USED
Output is not used

1 AIR FLAP CONTROL
Normally used to control an air flap, this output becomes active upon an Engine shutdown failure situation. Inactive when the set has come to rest.

2 ALARM RESET
The output indicates that an alarm reset being performed. Once the alarm reset has been completed, the output become inactive again. The output could be used to give an external reset signal to external systems.

3 AUDIBLE ALARM
The output indicates that the internal sounder is operating. It may be use for external sounder.

4 AUTO START INHIBIT
This output indicates that a digital input that has been configured as 'auto start inhibit' is active.

5 RESERVED

6 BATTERY HIGH VOLTAGE
This output indicates that a battery high voltage alarm has occurred.

7 BATTERY LOW VOLTAGE
This output indicates that a battery low voltage alarm has occurred.

8 RESERVED

9 CAN ECU POWER (only available at Trans-MiniAUTO++.CAN)
This output normally used to turn on the ECU (sometimes via an external slave relay). Some engine ECUs are permanently powered in which case the ECU Power output is used to give input to a Run (or similarly named) input on the ECU.

10 CAN ECU STOP (only available at Trans-MiniAUTO++.CAN)
This output used to give input to a Stop (or similarly named) input on the ECU. This is used as a backup stop system should the ECU Data link fail. In this instance, it is not possible to stop the engine using a data command as the link is not operative. As a backup, the STOP signal is given to the engine via a separate hardwired connection.

11 CHARGE ALTERNATOR FAILURE
This output indicates that a charging alternator failure has occurred.

12 COMMON ALARM
This output indicates that a warning, electrical trip or shutdown alarm has been activated.

13 COMMON ELECTRICAL TRIP ALARM
This output indicates that an electrical trip alarm has been activated. This output can only be reset by removal of the fault and by then pressing the RESET button.

14 COMMON SHUTDOWN ALARM
This output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and by then pressing the RESET button or by using an external 'alarm reset' input.

15 COMMON WARNING ALARM
This output indicates that a warning alarm has been activated. This output is normally self-resetting on removal of the fault.

16 COOLING FAN AFTER START
This output should energise as soon as engine has started so the fan should be running when the engine is running. This output should continue to operate for Cooling Fan Time parameter after engine has stopped.

17 COOLING FAN AFTER STOP
This output indicates that can be made to energise for Cooling Fan Time parameter after the engine shuts down (to run an electric cooling fan on the radiator).

18 COOLANT TEMPERATURE HIGH PRE-ALARM
This output indicates that a high engine coolant temperature warning (pre-alarm) has occurred.

19 COOLANT TEMPERATURE HIGH SHUTDOWN
This output indicates that a high engine coolant temperature shutdown has occurred.

20 COOLING DOWN TIMER IN PROGRESS
This output source will be active when the cooling off-load timer is running.

21 CRANK RELAY ENERGISED
The output mimics the operation of the crank relay. Can be used to control external logic circuitry.

22 DELAYED ALARMS ACTIVE
The output indicates that the delayed alarms now enabled. Can be used to control external logic circuitry.

23 DIGITAL INPUT1 ALARM
This output indicates that digital input 1 alarm has occurred.

24 DIGITAL INPUT2 ALARM
This output indicates that digital input 2 alarm has occurred.

25 DIGITAL INPUT3 ALARM
This output indicates that digital input 3 alarm has occurred.

26 RESERVED

27 RESERVED

28 RESERVED

29 RESERVED

30 RESERVED

31 RESERVED

32 RESERVED

33 RESERVED

34 RESERVED

35 RESERVED

36 RESERVED

37 RESERVED

38 RESERVED

39 EMERGENCY STOP
This output indicates that an emergency stop alarm has occurred.

40 FAIL TO START ALARM
This output indicates that the engine has not started after the specified number of attempts.

41 FAIL TO STOP ALARM
This output indicates that the generator has failed to stop within the selected time

42 CONFIGURABLE ANALOG INPUT CONTROL
Becomes active when the Analog Input falls below the "ANALOG INPUT ON" setting. If the output is already active it will become inactive when the Analog Input is above the “ANALOG INPUT OFF" setting.

43 FUEL RELAY ENERGISED
The output mimics the operation of the fuel relay. It can be used to control external logic circuitry.

44 GAS ENGINE IGNITION OUTPUT
With the engaging of the starter the ignition delay is started. If the ‘minimum ignition speed’ is reached after expiry of this time, the configurable relay output ‘ignition’ is set. When the necessary engine shutdown process, firstly gas valve is de-energised. Then ignition output is de-energised that after 5 seconds when the engine speed become lower than ‘minimum ignition speed’

45 GENERATOR AT REST
The output indicates that the generator is not running.

46 GENERATOR AVAILABLE
This output indicates when the generator is ready to accept load, i.e. after safety on and warm up timers have timed out.

47 GENERATOR CLOSED AUXILIARY
This output indicates that a digital input that has been configured as 'generator closed auxiliary' is active.

48 GENERATOR FAILED TO CLOSE
This output source has intended to be used to indicate a failure of the generator contactor or breaker. It can only be used if the unit is configured to use 'generator closed auxiliary' feedback.

49 GENERATOR FAILED TO OPEN
This output source has intended to be used to indicate a failure of the generator contactor or breaker. It can only be used if the unit is configured to use 'generator closed auxiliary' feedback.

50 GENERATOR HIGH FREQUENCY PRE-ALARM
This output indicates that a generator high frequency warning (pre-alarm) has occurred.

51 GENERATOR HIGH FREQUENCY SHUTDOWN
This output indicates that a generator high frequency shutdown has occurred.

52 GENERATOR HIGH VOLTAGE PRE-ALARM
This output indicates that a generator high voltage warning (pre-alarm) has occurred.

53 GENERATOR HIGH VOLTAGE SHUTDOWN
This output indicates that a generator high voltage shutdown has occurred.

54 GENERATOR LOAD INHIBIT
This output indicates that a digital input has been configured as 'generator load inhibit' is active.

55 GENERATOR LOW FREQUENCY PRE-ALARM
This output indicates that a generator low frequency warning (pre-alarm) has occurred.

56 GENERATOR LOW FREQUENCY SHUTDOWN
This output indicates that a generator low frequency shutdown has occurred.

57 GENERATOR LOW VOLTAGE PRE-ALARM
This output indicates that a generator low voltage warning (pre-alarm) has occurred.

58 GENERATOR LOW VOLTAGE SHUTDOWN
This output indicates that a generator low voltage shutdown has occurred.

59 GENERATOR STOPPING
This output indicates that the engine has been instructed to stop but has not come to rest.

60 GENERATOR OPEN BREAKER
This output used to control the load switching device. For Details see: "BREAKERS Page" section.

61 HORN OUTPUT LATCHED
This output indicates that the latched horn alarm has occurred.

62 HORN OUTPUT PULSED
This output indicates that the pulsed horn alarm has occurred.

63 LAMP TEST
This output indicates that the module is performing a lamp test.

64 RESERVED

65 LOSS OF MAGNETIC PICK-UP SPEED SIGNAL(only available at Trans-MiniAUTO++.MPU)
This output indicates that the magnetic pick up signal is not sufficient to be used by the unit for speed monitoring. The alarm can only operate if the speed signal fails to appearduring cranking. It is disabled if 'multiple attempts to engage' is selected. If the MPU fails during engine running this would result in an under speed alarm.

66 LOW TEMPERATURE
This output indicates that a low temperature warning has occurred.

67 MAINTENANCE DUE ALARM
This output indicates that the generator is now due for maintenance either because it has used all the available running hours or the periodic maintenance time has expired. To clear the output a maintenance reset must be performed.

68 RESERVED

69 RESERVED

70 RESERVED

71 RESERVED

72 RESERVED

73 RESERVED

74 RESERVED

75 RESERVED

76 RESERVED

77 RESERVED

78 NO LOADING COMMAND
This output indicates that the unit is not calling of the generator contactor or breaker to be closed. Should the unit close the generator contactor this output will become inactive.

79 OIL PRESSURE LOW PRE-ALARM
This output indicates that a low oil pressure warning (pre-alarm) has occurred.

80 OIL PRESSURE LOW SHUTDOWN
This output indicates that a low oil pressure shutdown has occurred.

81 CONFIGURABLE ANALOG INPUT HIGH PRE-ALARM
This output indicates that a high analog input warning (pre-alarm) has occurred.

82 CONFIGURABLE ANALOG INPUT HIGH SHUTDOWN
This output indicates that a high analog input shutdown has occurred.

83 OVER CURRENT PRE-ALARM
This output indicates that the over current pre-alarm has been reached.

84 OVER CURRENT ALARM
This output indicates that the over current trip level has been reached.

85 OVER POWER PRE-ALARM
This output indicates that the over power pre-alarm has been reached.

86 OVER POWER SHUTDOWN
This output indicates that the over power shutdown has been reached.

87 OVER SPEED PRE-ALARM
This output indicates that the over speed warning (pre-alarm) has occurred.

88 OVER SPEED SHUTDOWN
This output indicates that the over speed shutdown has occurred.

89 PANEL LOCK
This output indicates that the unit ‘panel lock’ is active. If the panel lock input is active, the unit will not respond to operation of the Mode select or start buttons. This allows the unit to be placed into a specific mode (such as auto) and then secured.

90 PRE-HEAT(during preheat timer)
The output controls the pre-heater. Pre-heat output is available for the duration of pre-heat timer, which terminates prior to cranking.

91 PRE-HEAT(until end of cranking)
The output controls the pre-heater. As 'Pre-heat (during pre-heat timer)' mode but pre-heat is also available during cranking.

92 PRE-HEAT(until end of warming)
The output controls the pre-heater. As 'Pre-heat (until safety on)' but pre-heat continues to be available until the warm-up timer has elapsed.

93 PRE-HEAT(until end safety on)
The output controls the pre-heater. As 'Pre-heat (until end of cranking)' but pre-heat is also available while waiting for the delayed alarms to become active.

94 REMOTE START PRESENT
This output indicates that a digital input that has been configured as 'remote start' is active. This output could be used to pass the remote start signal on to else where in the control system.

95 REMOTE STOP DELAY IN PROGRESS
This output source will be active to indicate that the return timer is running.

96 SHORT CIRCUIT
This output indicates that the module has detected a short circuit on the generator output.

97 SMOKE LIMITING
This output is used to supply a smoke-limiting signal to an Electronic Governor to limit smoke emissions on start-up. It is used in conjunction with the Smoke limit timer (Idle mode timer) settings. Once the timer has expired, the Smoke limit output will cease to operate allowing the engine to accelerate to normal running speed.

98 STARTING ALARM
This output is used to supply an external sounder with a signal that the engine is about to start. The output will be active during the start delay and pre-heat timer (if used).

99 STARTING ALARMS ARMED
The output indicates that the starting alarms are now enabled. It can be used to control external logic circuitry. Starting alarms are armed as soon as the unit commences starting of the engine and remain armed until the engine at rest.

100 STOP RELAY ENERGISED
The output mimics the operation of the stop relay. Can be used to control external logic circuitry.

101 SYSTEM IN AUTO MODE
The output indicates that the unit is in the Auto mode.

102 SYSTEM IN MANUAL MODE
The output indicates that the unit is in the Manual mode.

103 SYSTEM IN STOP MODE
The output indicates that the unit is in the Stop mode.

104 SYSTEM IN TEST MODE
The output indicates that the unit is in the Test mode.

105 UNDER CURRENT PRE-ALARM
This output indicates that the under current pre-alarm has been reached.

106 UNDER CURRENT ALARM
This output indicates that the under current trip level has been reached.

107 UNDER POWER PRE-ALARM
This output indicates that the under power pre-alarm has been reached.

108 UNDER POWER SHUTDOWN
This output indicates that the under power shutdown has been reached.

109 UNDER SPEED PRE-ALARM
This output indicates that an under speed warning (pre-alarm) has occurred.

110 UNDER SPEED SHUTDOWN
This output indicates that an under speed shutdown has occurred.

111 WAITING FOR GENERATOR
This output indicates that the engine has been instructed to start but has not yet become available. Once the generator becomes available this output will be in-active.

112 RESERVED

113 LOAD SUPPLY FROM GENERATOR
This output indicates that the load is supplying from generator.

114 RESERVED

115 CONFIGURABLE ANALOG INPUT LOW PRE-ALARM
This output indicates that a low configurable analog input-1 warning (pre-alarm) has occurred.

116 CONFIGURABLE ANALOG INPUT LOW SHUTDOWN
This output indicates that a low analog input-1 shutdown has occurred.

117 RESERVED

118 RESERVED

119 RESERVED

120 RESERVED

121 CHOKE ACTIVE
This ouput becomes active everytime generator cranks and stays active until the choke time expires.

122 REMOTE CONTROL ACTIVE
This output indicates that the engine is being controled remotely.

4.2.6 Timers

START TIMERS (*Timers->Start timers*)		Min	Max	Default	Unit
Remote start delay	Remote Start Delay	0	3600	4	Sec
Pre-heat	Pre-Heat	0	250	3	Sec
Pre-heat bypass	Pre-Heat Bypass	0	250	0	Min
Safety on delay	Safety On Delay	0	99	5	Sec
Warming up time	Warmup Time	0	250	3	Sec
Horn duration	Horn Duration	0 (dis)	999	60	Sec
Chg. excitation time	Charge Excitation Time	0	99(cont)	15	Sec
Cooling fan time	Cooling Fan Time	0	250	180	Sec
Idle mode time	Idle Mode Time (Smoke Limiting)	0 (dis)	3600	dis	Sec
Idle mode time off	Idle Mode Time Off (Smoke Limiting Off)	0	250	5	Sec

Remote Start Delay
This timer dictates how long the unit will wait after it has received a remote start signal before it will attempt to start. This prevent un-necessary starting on a fluctuating mains supply etc.

Pre-Heat
This timer dictates the duration that the pre-heat output will be active before an attempt is made to start the engine. Once this timer is expired cranking will commence.

Pre-Heat Bypass
This feature allows the unit to start a hot engine without performing an un-necessary pre-heat delay. The bypass timer is triggered by the generator starting and actually being loaded. If the generator started but does not achieve loading then the timer will not be triggered. The bypass timer is initiated once the engine has come to rest. If any attempts to start are requested within the duration of the bypass timer the start sequence will bypass the pre-heat timer.

Safety On Delay
This timer dictates how long the unit will ignore the Low Oil Pressure, High Engine Temperature, Underspeed, Undervolts and any other inputs configured as active from safety on. It allows the values such as oil pressure to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again. If configured to use 'fast loading', should all the monitored conditions, such as oil pressure, come to expected state prior to the end of the safety on timer, the timer will be terminated prematurely ensuring maximum protection as soon as possible.

Warmup Time
This timer is initiated once the engine is up and running. It delays loading the generator until it has stabilised. Once this timer is expired the 'Close generator' signal will be given and the generator is available to be loaded.

Horn Duration
This timer dictates how long the horn will work after the last error detected. Once after this timer ended unit will do horn reset.

Charge Excitation Time
Charge excitation was selectable as momentary / continuous operation.This timer dictates how long the Charge excitation will active.

Note: dis = disable cont = continuous

Cooling Fan Time
This timer dictates how long the Cooling Fan will continue to operate.

Idle Mode Time (Smoke Limiting)
This is the amount of time that the smoke limiting output will remain active for once the engine has started. While the smoke limiting output is active the engine will be held at a reduced speed to minimise smoke emissions on start-up. (Only if fitted with an appropriate Electronic Control Module). Once the timer has expired the engine will be allowed to accelerate up to its normal operating speed.

Idle Mode Time Off (Smoke Limiting Off)
This timer is started after the Idle mode timer (smoke limit timer) was expired. This is to allow the engine to accelerate to its normal running speed without triggering an underspeed alarm, etc.

STOPPING TIMERS (*Timers->Stopping timers*)		**Min**	**Max**	**Default**	**Unit**
Remote stop delay	Remote Stop Delay	0	250	4	Sec
Cooling time	Cooling Time	0 (dis)	3600	60	Sec
Fail to stop delay	Fail To Stop Time	15	99	30	Sec

Remote Stop Delay
This timer dictates how long the unit will wait after it has received a remote stop signal before it will attempt to stop. This prevent un-necessary stopping on a fluctuating mains supply etc.

Cooling Timer
This is the time the generator is to run off-load once the load transfer signal has ceased. This gives the engine time to cool down before shutdown.

Fail To Stop Time
Once the unit has given a shutdown signal to the engine it expects the engine to come to rest. It monitors the Oil pressure and speed sensing sources and if they still indicate engine movement when this timer expires a 'Fail To Stop' alarm signal is generated.

Note: dis = disable

4.2.7 User Adjustment

GEN. VOLTAGE OFFSET (*User adjustment->Gen. voltage offset*)		Min	Max	Default	Unit
Gen. V1 offset	Generator V1 Offset	-20	20	0	V~
Gen. V2 offset	Generator V2 Offset	-20	20	0	V~
Gen. V3 offset	Generator V3 Offset	-20	20	0	V~

CURRENT OFFSET (*User adjustment->Current offset*)		Min	Max	Default	Unit
Current I1 offset	Current I1 Offset	-20	20	0	A~
Current I2 offset	Current I2 Offset	-20	20	0	A~
Current I3 offset	Current I3 Offset	-20	20	0	A~

BATTERY&CHRG GEN.VOL (*User adjustment->Battery&chrg gen.vol*)		Min	Max	Default	Unit
Batt.volt offset	Battery Voltage Offset	-5.0	5.0	0	V⎓
Gen.chg.volt offset	Charge Generator Voltage Offset	-5.0	5.0	0	V⎓

SENDER INPUTS OFFSET (*User adjustment->Sender inputs offset*)		Min	Max	Default	Unit
Oil Pressure offset	Oil Pressure Offset	-2.0	2.0	0.0	BAR
Temperature offset	Coolant Temperature Offset	-20	20	0	ºC
Conf. AI offset	Configurable Analog Input Offset	-200	200	0	%

Error Messages And Explanations:

Battery high warning! : Battery high error
Battery low warning! : Battery low error
Can bus warning! : Can bus error (Only available at Trans-MiniAUTO++.CAN devices)
Charge alterntr fail! : Caharge alternator fail
Conf. AI low error! : Configurable analogue input low error
Conf. AI low prealr! : Configurable analogue input low prealarm
Conf. AI high error! : Configurable analogue input high error
Conf. AI high preal! : Configurable analogue input high prealarm
Conf. AI sensor err! : Configurable analogue input sensor break
Emergency stop! : Emergency stop error
Fail to start alarm! : Fail to start alarm
Gen break.close fail! : Generator breaker not closed alarm
Gen break.open fail! : Generator breaker not opened alarm
Gen over frq.prealr! : Generator over frequency prealarm
Gen over frq.shutdwn! : Generator over frequency shutdown
Gen over vol.shutdwn! : Generator over voltage shutdown
Gen over volt.prealr! : Generator over voltage prealarm
Gen stop fail! : Generator stop error
Gen under frq.prealr! : Generator under frequency prealarm
Gen under frq.shtdwn! : Generator under frequency shutdown
Gen under vol.shtdwn! : Generator under voltage shutdown
Gen under volt.preal! : Generator under voltage prealarm
High temp.prealarm! : Temp prealarm
High temp.shutdown! : High temp. shutdown
J1939 ECU warning! : Amber warning lamp error (Only available at Trans-MiniAUTO++.CAN devices)
Low temperature! : Low temperature
Maintenance alarm! : Maintenance error
Oil press.shutdown! : Pressure shutdown
Over curr.trip cool.! : Over current electrical trip
Over current prealr! : Over current prealarm
Over current trip! : Over current error
Over current warnng! : Over current warning
Over power alarm! : Over power error
Over power prealarm! : Over power prealarm
Over speed alarm! : Over speed error
Over speed prealarm! : Over speed prealarm
Pressure prealarm! : Pressure prealarm
Pressure sensor err! : Oil pressure sensor break
Red stop lamp! : Red stop lamp error (Only available at Trans-MiniAUTO++.CAN devices)
Short circuit trip! : Short Circuit Error
Spare-1 alarm! : Spare 1 error
Spare-2 alarm! : Spare 2 error
Spare-3 alarm! : Spare 3 error
Speed loss alarm! : Speed loss error (Only available at Trans-MiniAUTO++.MPU devices)
Temperat. sensor err! : Temperature sensor break
Under curr.trip cool! : Under current electrical trip
Under current prealr! : Under current prealarm
Under current trip! : Under current error
Under current warnng! : Under current warning
Under power prealarm! : Under power prealarm
Under power trip! : Under power error
Under speed prealarm! : Under speed prealarm
Under speed trip! : Under speed error

Event Messages And Explanations:

Battery high warning : Battery high error
Battery low warning : Battery low error
Can bus warning : Can bus error (Only available at Trans-MiniAUTO++.CAN devices)
Changed mode to auto : Changed mode to auto
Changed mode to man : Changed mode to manual
Changed mode to stop : Changed mode to stop
Changed mode to test : Changed mode to test
Charge alterntr fail : Caharge alternator fail
Conf. AI high error : Configurable analogue input high error
Conf. AI high preal : Configurable analogue input high prealarm
Conf. AI low error : Configurable analogue input low error
Conf. AI low prealr : Configurable analogue input low prealarm
Conf. AI sensor err : Configurable analogue input sensor break
Emergency stop : Emergency stop error
Fail to start alarm : Fail to start alarm
Gen break.close fail : Generator breaker not closed alarm
Gen break.open fail : Generator breaker not opened alarm
Gen over frq.prealr : Generator over frequency prealarm
Gen over frq.shutdwn : Generator over frequency shutdown
Gen over vol.prealr : Generator over voltage prealarm
Gen over vol.shutdwn : Generator over voltage shutdown
Gen stop fail : Generator stop error
Gen under frq.preal : Generator under frequency prealarm
Gen under frq.shtdwn : Generator under frequency shutdown
Gen under vol.preal : Generator under voltage prealarm
Gen under vol.shtdwn : Generator under voltage shutdown
High temp.prealarm : High temp. prealarm
High temp.shutdown : High temp. shutdown
J1939 ECU warning : Amber warning lamp error (Only available at Trans-MiniAUTO++.CAN devices)
Low temperature : Low temperature
Maintenance alarm : Maintenance error
Maintenance warning : Maintenance warning
Oil press.shutdown : Pressure shutdown
Over current alarm : Over current alarm
Over current prealr : Over current prealarm
Over power alarm : Over power error
Over power prealarm : Over power prealarm
Over speed prealarm : Over speed prealarm
Over speed shutdown : Over speed shutdown
Pressure prealarm : Pressure prealarm
Pressure sensor err : Oil pressure sensor break
Red stop lamp : Red stop lamp error (Only available at Trans-MiniAUTO++.CAN devices)
Short circuit alarm : Short circuit alarm
Spare-1 alarm : Spare 1 error
Spare-2 alarm : Spare 2 error
Spare-3 alarm : Spare 3 error
Speed loss alarm : Magnetic pickup loss of speed error (Only available at Trans-MiniAUTO++.MPU devices)
Temperat. sensor err : Temperature sensor break
Under current alarm : Under current error
Under current prealr : Under current prealarm
Under power alarm : Under power error
Under power prealarm : Under power prealarm
Under speed prealarm : Under speed prealarm
Under speed shutdown : Under speed shutdown

5. Specifications

Equipment use	: Electrical control equipment for generating sets.
Housing & Mounting	:111 mm x 81 mm x 61 mm. (including connectors). Plastic housing for panel mounting.
Panel Cut-Out	: 81mm x 70mm.
Protection	: IP65 at front panel.
Weight	: Approximately 0,3 Kg.
Environmental rating	: Standard, indoor at an altitude of less then 2000 meters with non-condensing humidity.
Operating/Storage Temperature	: -20°C to +70°C / -30°C to +80°C
Operating/Storage Humidity	: 90 % max. (non-condensing)
Installation Over Volt. Category	: II Appliances, portable equipment
Pollution Degree	: II, Normal office or workplace, non conductive pollution
Mode of Operation	: Continuous.
DC Battery Supply Voltage	: 8 to 32 V ⎓. Max. operating current is 360 mA.
Cranking Dropouts	: Battery voltage can be “0” VDC for max. 50 ms during cranking (battery voltage should be at least nominal voltage before cranking).
Battery Voltage Measurement	: 8 to 32 V ⎓, accuracy: 1 % FS, resolution: 0,1 V
Generator Voltage Measurement	: 3 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V.
Generator Frequency	: 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.
Magnetic Pickup Input	: 35 to 10000 Hz (4 to 35 volts peak continuously). Accuracy: 0,25 % FS. (Only available at Trans-MiniAUTO++.MPU devices)
CT secondary	: 5A.
Charge Generator Excitation	: 210mA @12V, 105mA @24V. Nominal 2.5W.
Charge Gen. Vol. Measurement	: 8 to 32 V ⎓, accuracy: 1 % FS, resolution: 0,1 V.
Sender Measurement	: 0 to 1300 ohm, accuracy: 1 % FS, resolution: 1 ohm.
Communication interface	: RS-232, CanBus communication with 1939 ECU(Only available at Trans-MiniAUTO++.CAN devices)
Relay Outputs	: Generator contactor relay output 8A at DC supply voltage
Transistor Outputs	: Fuel or Configurable output-1 1A at DC supply voltage Crank or Configurable output-2 1A at DC supply voltage Configurable output-3 1A at DC supply voltage Configurable output-4 1A at DC supply voltage Configurable output-5 1A at DC supply voltage All transistor ouputs supplied from DC supply terminal 12